

20-1025 (Lead); 20-1138 (Consolidated)

**UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

ENVIRONMENTAL HEALTH TRUST; CONSUMERS FOR SAFE CELL
PHONES; ELIZABETH BARRIS; THEODORA SCARATO

CHILDREN'S HEALTH DEFENSE; MICHELE HERTZ; PETRA BROKKEN;
DR. DAVID O. CARPENTER; DR. PAUL DART; DR. TORIL H. JELTER; DR.
ANN LEE; VIRGINIA FARVER, JENNIFER BARAN; PAUL STANLEY, M.Ed.

Petitioners

v.

FEDERAL COMMUNICATIONS COMMISSION;
UNITED STATES OF AMERICA

Respondents

Petition for Review of Order Issued by the
Federal Communications Commission

PETITIONERS' JOINT OPENING BRIEF ADDENDUM VOLUME IV
(PAGES AD_00413-AD_00532)

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Affidavit of Michele Hertz in Support of Standing

**UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

Children's Health Defense, Michele Hertz,)
 Petra Brokken, Dr. David O. Carpenter, Dr.)
 Paul Dart, Dr. Toril H. Jelter, Dr. Ann Lee,)
 Virginia Farver, Jennifer Baran, Paul)
 Stanley, M.Ed.)
 Petitioners)
 v.)
 Federal Communications Commission and)
 United States of America,)
 Respondents)

Case No: 20-1138

Petition for Review of Order by the Federal
 Communications Commission
 (FCC 19-126)

(Consolidated with Case No. 20-1025)

AFFIDAVIT OF MICHELE HERTZ IN SUPPORT OF STANDING

1. I am one of the named Petitioners in the above captioned proceeding. My home address is 792 Sleepy Hollow Road, Briarcliff Manor, New York 10510. When I submitted comments to the FCC, my address was 62 Euclid Avenue, Hastings on Hudson, New York 10706. I am a member of Children's Health Defense.
2. The purpose of this Affidavit is to provide evidence of my standing to pursue the matter. I will provide some of the basic facts particular to my individual circumstances, but also rely on the presentations contained in the Affidavits of Dafna Tachover, Dr. Paul Dart, Dr. Toril Jelter and Dr. David Carpenter to explain why the basic facts I present below demonstrate that I have suffered an injury-in-fact traceable to the FCC Order that could be redressed by an order from this Court holding unlawful, vacating, enjoining, and/or setting aside the FCC Order and remanding the matter to the FCC for further consideration and action.
3. I filed 4 sets of comments with the FCC in the proceedings below on February 6, 2013¹, March 7, 2013², September 3, 2013³ and July 12, 2016.⁴ Each filing described my illness from exposure to wireless radiation and asked the FCC to recognize the injuries suffered by individuals like me and change its guidelines and rules to adequately protect the public from the harms being caused by their current regulatory approach.
4. I previously led a normal life with my husband and two sons. We traveled and both my husband and I had careers that we loved. We used Wi-Fi at home and used cell phones. Suddenly, for no obvious reason, I became sick. Another member of our household developed health issues but mine were the most severe and unrecognizable.
5. In 2007, however, Central Hudson (the electric utility company for our newly constructed weekend home in Accord, New York), installed a wireless radiofrequency (RF) transmitting utility meter at our property. Soon thereafter, and only when we were in Accord, I began to experience heart palpitations that would startle me awake from sleep. I became concerned that I had a heart problem, so I went to my doctor. He tested my heart and found nothing wrong with my heart. I continued to have occasional and uncomfortable heart palpitations, again, only while I was in our home in Accord.
6. In mid-2009, Con Edison replaced the analog gas and electric utility meters serving our full-time residence in Hastings on Hudson, New York, with wireless meters. I asked one of the Con Edison workers if the

¹ <https://www.fcc.gov/ecfs/filing/6017162631>.

² <https://www.fcc.gov/ecfs/filing/6017166976>.

³ <https://www.fcc.gov/ecfs/filing/6017465975>.

⁴ <https://www.fcc.gov/ecfs/filing/1071387223273>.

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meters were safe. He responded they were safe and "were no different than a cell phone." He told me the meter would transmit a cell phone-like signal once a month to a passing Con Edison truck. At the time, I trusted that the representations he made were true and accurate and I relied upon those representations to allow the installation of the wireless utility meter.

7. I spent much of the summer of 2009 in Accord. I continued to have sporadic heart palpitations when I was there. At the end of the summer we returned to Hastings. I soon began to experience more frequent heart palpitations and additional symptoms including agitation, memory and word loss, inability to concentrate on my work, nervousness and anxiety, long bouts of diarrhea and weight loss and unusual menstrual disruption. A mole on my back suddenly began to grow larger. I was 50 years old at that time and began to wonder if I was developing early onset Alzheimer's. I was obviously not well, so I again went to my doctor. He was unable to diagnose the cause of my ailments.

8. During a February 2010 major snowstorm in Hastings, I was at home alone. The electricity went on and off several times during that storm. One of the disruptions occurred while I was in my living room next to my fireplace and about five feet away from the wireless utility meter on the exterior wall. I heard a very high-pitched piercing sound in my right ear and I began to suffer painful pressure in my head and both of my ears. It was so bad I doubled over in pain. Almost immediately thereafter I developed even worse symptoms. I would hear a constant loud and very disturbing buzzing-pulsing sound, especially in my right ear. I was extremely agitated for no discernible reason. My sleep would be interrupted, and I had nightmares about being attacked. The heart palpitations became more common and so severe I feared I would suffer a heart attack. I had pain in my jaws and teeth. The mole on my back began to blow up and grow larger over the following weeks.

9. I began to sleep on my kitchen floor so that the sound of the refrigerator would drown out the terrible buzzing in my ears. During this same period my husband developed high blood pressure and had to be placed on blood pressure medication and the rest of my family was often agitated and uneasy. I soon noticed that I felt better when outside, so I began to suspect that something was wrong inside, perhaps with the electricity.

10. After a conversation with an electrical specialist, I began to suspect that my symptoms might be traceable to the wireless utility meters that Central Hudson and Con Edison had installed at our two homes because my ailments all started when they were installed. The wireless utility meters were the only newly introduced electrical and technical appliances in our homes. After doing research on RF radiation, it seemed likely that we were all being harmed by the RF radiation coming from the wireless utility meters.

11. I requested that both Con Edison and Central Hudson replace all wireless utility meters from our homes with analog meters. Con Edison, after many requests, agreed to remove the wireless utility meters and install analog replacements if I presented a doctor's letter. I gave them the doctor's letter and, after some delays we were given analog meters in our principal residence. I experienced an immediate improvement in my condition. I felt as if I were being released from being electrocuted, and within hours I began feeling slightly better. The loud buzzing-pulsing did not go entirely away but it did get noticeably quieter. My thoughts became less scrambled. Within weeks the mole on my back bled, dried up and fell off. My dermatologist was quite surprised. I began to intermittently menstruate, although never normally again.

12. I learned that other people in Hastings also became ill after wireless utility meters were installed on their homes. None of them were able to get the utility companies to remove the meters despite vigorous requests for the utilities to do this. Utility companies continue to falsely claim the meters are safe and tested by the FCC and refuse to remove them, even when a letter from a doctor has been supplied, asking for their removal.

13. Once I was able to firmly link the wireless utility meters to my illness and symptoms, I started to contact the utilities, elected officials and state and local government agencies, including the FCC, to report that there was something wrong with these meters. The irresponsible, dismissive, discourteous and lame responses I received, especially from the FCC, stunned me. This prompted me to create an organized group effort to bring attention to the problem. We hired an RF engineer. His report uncovered that the FCC's approved wireless

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utility meters rely on meaningless and inappropriate testing. We presented his report and the evidence to the New York State Public Service Commission, who ignored them and told us all repeatedly that for help on this matter we should contact the FCC.

14. In my attempts to bring attention to this matter, I contacted the FCC numerous times. On one occasion an FCC representative told me "We don't deal with humans, only frequencies" and hung up. Another time the employee became indignant and when I asked his name he hung up. Five minutes later he called me back, apparently from his personal cell phone, and admitted that what I was saying was correct: there was a problem with wireless utility meters. I was pleased to hear that, but the fact he had to take special steps to avoid having his admission be heard by others at the Commission strongly implies it is actually aware of the problem but refuses to make a statement formally and publicly.

15. I, and the organizations I am involved with, have been working on this for almost 10 years. Along with the FCC we have contacted other federal agencies for help, but this has proven to be futile. They send us through pointless round trips through multiple agencies that merely end back at the FCC. I contacted the Federal Consumer Product Safety Commission by phone. In the middle of taking my complaint the person suddenly put me on hold and when she came back, she said "I'm sorry we can't take complaints about smart meters." I tried the U.S. Department of Health and Human Services by phone and email, but they referred me to the U.S. Department of Energy. When I dutifully contacted the Department of Energy by mail, fax and email, they referred me to the New York State Public Service Commission, which had already told me to contact the FCC. So, I went back to the FCC, which this time told me to contact the U.S. Environmental Protection Agency (EPA). The EPA, however remitted me back to the FCC.

16. I continue to work on this issue as the President of NYSUMA – New York Safe Utility Meter Association, a 501c organization. We are fighting for the right of all New York State residents to have a safe utility meter choice. The roadblock we continually hit is the ignorant reliance, by local, state and federal agencies and others, on FCC RF guidelines that are based on an obsolete hypothesis that there are only thermal effects, while ignoring the clear human evidence of which I am a part of, and clear science of harms from long term exposure to non-thermal levels of radiation from pulsed and modulated radio and microwave frequencies based technologies.

17. After the wireless utility meters were removed from my properties, I felt better but continued to experience symptoms from wireless devices and infrastructure. Our home in Hastings was flooded with RF radiation from numerous wireless sources such as cell towers along with wireless electric water and gas utility meters and Wi-Fi routers in nearby houses. There were nights when I was in Hastings, that I would wake up thinking there was an earthquake, but it merely was my own body quaking and shaking. We loved living in Hastings; we spent 22 years carefully restoring our historic 1910 home, getting involved in community and school affairs and feeling at home in the Hastings community. After our youngest son went to college I therefore began living, part-time, at our house upstate because I could no longer tolerate our neighborhood in Hastings. In 2019, after 22 years, my husband and I were forced to move from our home in Hastings to where we now reside.

18. I am now 61 years old. After what I endured from wireless utility meters my life has been irrevocably altered. I have Microwave sickness with indications that are similar to what the American embassy workers in Cuba reported after they were exposed to "non-thermal" RF/Microwave weaponry or spy equipment. Professor Beatrice Golomb, MD PhD from the University of California San Diego medical school, published a paper that provides a scientific basis for this explanation⁵.

⁵ Golomb B. Diplomats' mystery illness and pulsed radiofrequency/microwave radiation. Neural Comput. 2018 Sep 5. doi: 10.1162/neco_a_01133, available at <https://www.ncbi.nlm.nih.gov/pubmed/30183509>; abstract filed below at

AFFIDAVIT OF MICHELE HERTZ IN SUPPORT OF STANDING

19. In the following paragraphs, I will explain how Microwave sickness presently affects me:

A. Wireless Utility Meters: When I am in the vicinity of one or more wireless utility meters, I will get shooting pains in my temple and head and feel my temperature rise and my heart weirdly thumping and skipping beats, and I cannot sleep.

B. Wi-Fi Routers: When exposed to Wi-Fi radiation, I get a tightening sensation on the top of my skull and headaches. When I try to sleep where there is Wi-Fi, my brain feels like it goes into spasms and I cannot sleep deeply for several days. For this reason, traveling is torturous because Wi-Fi is everywhere.

C. Cell Phones: I get shooting pains through my temples. I can be sitting in a restaurant, enjoying the company of friends and family, and I will suddenly be struck with a shooting pain through my head that stops me mid-sentence, bends me over in pain and makes me forget what I was saying. I then realize upon turning around that someone behind me, who had been out of my sightline, is using a cell phone. We do not allow the use of cell phones in our home. When someone forgets or tries to sneak a quick cell phone call in our home, I will get shooting pains in my temples and head and feel my temperature rise and my heart weirdly thumping and skipping beats, and I cannot sleep.

D. Cell Towers: If I am near a cell tower, I will get those same shooting pain in my temples and head and feel my temperature rise and my heart weirdly thumping and skipping beats, and I cannot sleep. When I am driving on long trips and I feel tired and need to rest for a while I cannot stop near cell towers/transmitters because they prevent me from falling asleep. This puts my life in danger when I cannot find a place to rest.

E. Computers: Since this whole problem began I have developed Grave's disease, which I attribute to RF exposure. This is an auto-immune disorder that causes hyperthyroidism and it has seriously affected my eyes. Computers hurt my eyes. I wear protective glasses and I have applied a special blue light cover on the screen of my computer. All the wireless on my laptop is disabled. In our home everyone exclusively uses wired internet connections.

20. Presently, I shy away from spending time in social situations, unless I am with people who are considerate of my sickness from wireless radiation. Because I am an artist, I previously spent a great deal of time in museums, but now, with all of the wireless equipment present, I have stopped going to museums. I had to leave the sculpture studio where I had worked three to four full days a week for many years in 2010 because of all the wireless radiation. Last year, I began going there again but for only one-half day a week and I wear an RF protective hat that helps to diminish the effect of the RF radiation. I must live in a way that best protects me from exposure to RF radiation but, with the increasing proliferation of wireless technology as a result of the active support of the FCC and its complete disregard to health and safety, that is getting more and more difficult.

21. We moved away from Hastings only to learn that a cell tower, possibly with 5G equipment, was being installed near our new home and is now up and running. That cell array is very close to a horse farm where I have been taking riding lessons. Since the installation of that tower, three horses have died and there are now health problems with some of the other horses. It is a living nightmare.

22. One of my sons and his wife have moved to the southern United States. This will be an airplane ride away. Flying has become almost impossible for me. Being locked in a metal box with tremendous levels of RF radiation does not only make me sick but, because of my heart response to RF radiation, I am terrified that I could have a heart attack. Finding a place to stay is almost impossible. The last two times that we stayed in a

<https://ecfsapi.fcc.gov/file/1091330786203/Wireless%20radiation%20and%20EMF%20abstracts%20August%202016%20-%20August%202019%20Joel%20Moskowitz%209-13-2019.pdf> on pages 206-207.

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hotel I could not sleep and felt unwell for the whole stay. Last summer, my husband and I traveled for five hours by car to an inn on a lake in upstate, New York. I had been promised by the manager that there was no wireless utility meter on the cabin that we were to rent. When we arrived at the inn I noticed immediately that the top of my head started to feel a tightening. I attributed this to strong Wi-Fi signals. Our cabin was away from the main inn and they said that they had shut down the Wi-Fi for us. When we got to the front door of the cabin, there was a wireless utility meter right on the front wall. We had to turn around and drive five more hours to get home because it would have been impossible for us to find a place that would be safe for me.

23. I have learned that avoiding RF radiation is my only recourse. It is isolating. It has led to a great deal of loss. Government regulators deny the facts and ignore the science. The FCC is deemed the ultimate regulator for RF safety, but that is far outside their expertise. After all, as the FCC employee advised me "We don't deal with humans, only frequencies." The government has failed us while placing everyone at risk.

24. The FCC order did not adequately consider, or reasonably respond to my comments or those of others who explained the injuries they have suffered and asked for relief. Their decision to retain their existing rules without addressing the problems faced by those that are already afflicted with illness entirely failed to resolve the problems I and my family face in daily life as a result of chronic, long-term exposure and the prospect of continued exposure to harmful radiation in the future as this technology further proliferates. The present rules do not adequately protect my or the public's health and safety, and in fact, directly allow and encourage continuous harm from non-consensual exposure. The FCC's decision not to materially change its limits and guidelines means I cannot obtain any relief from non-consensual exposure at any level. My family is exposed to non-consensual radiation wherever we go, including in our own home. For so long as the FCC refuses to revise its standards, limits and guidelines I will suffer an injury-in-fact.

25. My injury would be redressed by an order from this Court holding unlawful, vacating, enjoining, and/or setting aside the FCC Order and remanding the matter to the FCC for further consideration and action. If the FCC guidelines are revised to prevent harm from exposure or at least make some provision for those already injured by exposure I may finally get some relief from my suffering and will no longer be compelled to help others understand why they suffer too.

26. This concludes my Affidavit, as noted above, I am also relying on the Affidavits of Dafna Tachover, Dr. Paul Dart, Dr. Toril Jelter and Dr. David Carpenter for the purpose of explaining why the particular facts described above demonstrate standing.

Further Affiant sayeth not.


Michele Hertz

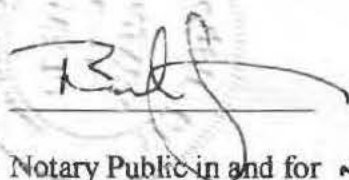
STATE OF NEW YORK)

:ss.:

COUNTY OF WESTCHESTER (Signatory))

COUNTY OF KINGS (Notary))

SUBSCRIBED AND SWORN TO BEFORE ME this 6th day of May, 2020.



Brendan Cyr
Notary Public-State of New York
No. 02CY6235114
Qualified in New York County
My Commission Expires January 31, 2023

Notary Public in and for New York State

Notarized remotely pursuant to New York State Executive Order 202.7

Affidavit of Professor David Carpenter, MD in Support of Standing

**UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

Children's Health Defense, Michele Hertz,)	Case No: 20-1138
Petra Brokken, Dr. David O. Carpenter, Dr.)	
Paul Dart, Dr. Toril H. Jelter, Dr. Ann Lee,)	Petition for Review of Order by the Federal
Virginia Farver, Jennifer Baran, Paul)	Communications Commission
Stanley, M.Ed.)	(FCC 19-126)
Petitioners)	
)	(Consolidated with Case No. 20-1025)
v.)	
)	
Federal Communications Commission and)	
United States of America,)	
Respondents)	

AFFIDAVIT OF DAVID O. CARPENTER, MD IN SUPPORT OF STANDING

1. My name is David O. Carpenter. My address is [REDACTED], Schenectady, NY 12303. I am one of the named Petitioners in the above captioned proceeding.

2. This Affidavit is to provide evidence of my standing to pursue the matter. I will provide some of the basic facts particular to my individual circumstances. I have suffered an injury-in-fact that is traceable to the FCC Order that could be redressed by an order from this Court holding unlawful, vacating, enjoining, and/or setting aside the FCC Order and remanding the matter to the FCC for further consideration and action. I also provide the scientific support for my co-Petitioners' individual claims of injury.

3. I filed comments and several expert reports in the FCC proceedings below on August 26, 2013,¹ and November 13, 2013.² I am also part of the BioInitiative Working Group (BIWG), which filed additional materials on April 13, 2014, and November 8, 2017. I and BIWG provided evidence and analysis and made positive recommendations.

4. The expert reports I and the BIWG filed below largely rely on the BioInitiative Report ("BIR"). We testified that "evidence for health risks comes directly from thousands of published scientific and public health studies showing that increasing Radio Frequency ("RF") radiation (RFR) levels are producing 'epidemiologically-visible' health harm across very large populations of exposed people. Our expert submission concluded that RFR levels common today are creating intolerable health problems and should be rolled back.

Credentials

5. I am a Professor and Director of the Institute for Health and the Environment at the University at Albany, State University of New York. Our Institute is a Collaborating Center of the World Health Organization.

¹ <https://www.fcc.gov/ecfs/filing/6017464846>.

² <https://www.fcc.gov/ecfs/filing/6017476892>.

6. I graduated from Harvard Medical School and chose a career in public health and research rather than clinical medical practice. I have been a medical doctor and public health expert for 50 years and have served the federal government and the State of New York. I have published over 450 peer-reviewed scientific papers.

7. Public health medicine practitioners do not directly treat individual patients. We focus on preventing disease. We try to identify what causes disease, and then identify ways to reduce and prevent those causes. We study the health of *populations*, not individuals.

8. In the past 40 years, a major focus of my public health work has been the study of human health effects of electromagnetic fields (EMFs).

9. I have served on both national and international organizations addressing the topic and constantly work on policy and safety guidelines. I have published 12 reviews on various aspects of health effects of EMFs in peer-reviewed journals, wrote an invited chapter on the subject for a standard textbook, edited six books, two of which were entitled *Biological Effects of Electric and Magnetic Fields*, and published many invited book chapters and reviews. I am the Editor in Chief of *Reviews on Environmental Health*. I was the founding Editor-in-Chief and now Editorial Advisor of *Cellular and Molecular Neurobiology*. I am also on the editorial boards of *International Archives of Occupational and Environmental Health*; *Global Health Perspective*; *Environment International*; and *International Journal of Environmental Research and Public Health*.

10. I have testified on the subject at hand before the U.S. House of Representatives and the President's Cancer Panel, in addition to a number of state hearings. I have been confirmed as a testifying expert in court cases on the topic of causation from wireless technology.

11. Two of my previous positions include serving as a Commissioner Officer in the U.S. Public Health Services, stationed at the National Institute of Mental Health in Bethesda, MD, and Director of the Neurobiology Department at the Armed Forces Radiobiology Research Institute, the research arm of the Defense Nuclear Agency located at the Naval Medical Center in Bethesda. In the latter role I became familiar with concerns that exposure to EMFs from radar were causing adverse health effects. This was an active research area within the Navy in 1973-1979. Radar, like wireless technology, uses non-ionizing microwave frequencies and emits radiation at non-thermal intensities. The Navy investigated the potential health effects because soldiers exposed to radar kept getting sick and showing symptoms similar to those now being experienced by the general population after exposure to pulsed and modulated RFR.

12. In 1980 I was appointed Director of the Wadsworth Center for Laboratories and Research of the New York State Department of Health (NYSDOH). At that time, the Wadsworth Center had over 1,000 employees; it was the third largest public health laboratory in the U.S. after the National Institute of Health (NIH) and Centers for Disease Control (CDC). While employed by the NYSDOH I was appointed Administrator of the New York State Powerlines Project. Our task was to determine whether magnetic fields coming from electricity cause adverse health effects. These studies confirmed earlier results showing that children living in homes that had elevated magnetic fields from neighborhood power lines had a higher risk of leukemia, and also found significant biological effects in cellular and animal studies. After the Project concluded in 1987, I served as the spokesperson for New York State on the issue of health effects of EMFs

until I moved to the University at Albany in 1998. My CV is attached and marked Carpenter Exhibit 1.

The BioInitiative Report

13. I am the Co-Editor in Chief of the BioInitiative Report (BIR), which was prepared by the BioInitiative Working Group (BIWG) comprised of 29 the world's leading scientists and public health experts on the subject of health effects of RF/EMFs. It is the most comprehensive independent review of the scientific evidence on the biological and health effects of wireless technology. The purpose was to provide "*a rationale for a biologically-based public exposure standards for electromagnetic fields and RF.*"

14. The 2012 BIR contains 1,500 pages of detailed scientific reviews of 3,800 peer-reviewed studies addressing RF radiation (RFR) and extremely low frequencies (ELFs). The report was first published in 2007, updated in 2012, 2014, 2017 and most recently in 2020.

15. The FCC takes the position that the only hazards of RF are those where the intensity is sufficiently high to cause tissue heating. This position, a disproven hypothesis, comes from organizations such as the Institute of Electrical and Electronics Engineers (IEEE), an organization that has no health expertise, and others in the physics community who believe that non-thermal levels of non-ionizing radiation have insufficient energy to cause biological effects. That is an assumption and it is false. In biology, unlike in physics, it is the response of the organism, not the power of the source, that determines the effects. Organisms respond to RF/EMFs in many ways that have nothing to do with thermal heating, and those responses often lead to human diseases.

16. The BIR was developed to present in encyclopedic detail the existence of clear and reproducible scientific evidence of biological and adverse effects of RF/EMFs that can lead to significant human harm and illness, and to show that the FCC assumptions are false and guidelines are inadequate to protect the public's health.

17. The BIR conclusions and recommendations are in section 24 which I co-authored. We conclude:

We determined that bioeffects are clearly established and occur at very low levels of exposure to electromagnetic fields and radiofrequency radiation. Bioeffects can occur in the first few minutes at levels associated with cell and cordless phone use. Bioeffects can also occur from just minutes of exposure to mobile phone masts (cell towers), Wi-Fi, and wireless utility 'smart' meters that produce whole-body exposure. Chronic base station level exposures can result in illness. Many of these bioeffects can reasonably be expected to result in adverse health effects if the exposures are prolonged or chronic. This is because they interfere with normal body processes (disrupt homeostasis), prevent the body from healing damaged DNA, produce immune system imbalances, metabolic disruption and lower resistance to disease across multiple pathways. Essential bodily processes can eventually be disabled by incessant external stresses (from system-wide electrophysiological interference) and lead to pervasive impairment of metabolic and reproductive functions.

The BIR Science

18. The BIR reviewed and provided evidence for Effects on Gene And Protein Expression (Section 5); Evidence For Genotoxic Effects (Section 6); Evidence for Stress Response (Stress Proteins) (Section 7); Effects On The Immune System (Section 8); Evidence for Effects on Neurology and Behavior (Section 9); Evidence for effects of Electromagnetic Fields From Wireless Communication upon the Blood-Brain Barrier (Section 10); Evidence For Brain Tumors And Acoustic Neuromas (Section 11); Evidence for Disruption by the Modulating Signal (Section 15); Evidence based on EMF Medical Therapeutics (Section 17); Electromagnetic Field Exposure Effects (ELF-EMF and RFR) on Fertility and Reproduction (Section 18); Fetal and Neonatal Effects of EMF (Section 19); Findings in Autism (ASD) Consistent with Electromagnetic Fields (EMF) and Radiofrequency Radiation (RFR) (Section 20). The evidence of each section was reviewed by the leading relevant experts.

19. To help visualize the extent of the scientific evidence, the BIR includes two RF Color Charts of Reported Biological Effects from Radiofrequency Radiation at Low-Intensity (i.e., non-thermal) Exposure. The charts are color-coded—each of the eight colors represents a different harm. Among the harms shown: creation of stress proteins and disrupted immune function; reproductive effects; DNA repair damage; oxidative stress; disruptive calcium metabolism; brain tumors; damage to the Blood-Brain Barrier (BBB); neurological effects; cancer and cell proliferation; and vascular system effects. Each chart contains about 60 studies. The charts submitted in the record are reproduced as Carpenter Exhibit 2.

20. The first chart presents studies which rely on power density levels. The studies are arranged from the lower levels (the first study shows effects at $0.000,000,000,001 \mu\text{W}/\text{cm}^2$) progressing up to the maximum FCC-allowed levels which are between $200\text{--}1,000 \mu\text{W}/\text{cm}^2$ depending on the frequency. This table shows biological effects from levels that are even $50,000,000,000,000,000$ times lower than the FCC-allowed levels. The second table presents studies with Specific Absorption Rate (SAR) levels used for devices in close proximity, such as cell phone. The studies reveal harms at levels $25,000$ times lower (0.000064 w/kg) than the maximum FCC-allowed levels of 1.6 w/kg .

21. The BIR authors have extraordinary credentials and associations. They include some of the most accomplished scientists on EMF/RFR worldwide. Prof. Martin Blank was a professor at Columbia university with PhDs from Columbia and Cambridge. He conducted studies that show effects of EMFs including RFs on cells and DNA. Prof. Henri Lai, PhD, Professor Emeritus of Bioengineering in the University of Washington. His 1995 study was the first to show that modulated RF/EMF can break DNA. Prof. Lennart Hardell MD, PhD is an oncologist and a renowned expert on RF/EMF and brain cancer. Dr. Carl Blackman, is a retired EPA RF lab scientist. His studies showed the effects of modulations. Prof. Leif Salford MD PhD., chairs the Department of Neurosurgery in Lund University Hospital, Sweden. His RF/EMF studies show RF damage to the Blood-Brain-Barrier (BBB) and other neurological effects. Igor Belyaev, DSc, PhD. wrote the technical sections because of his superior understanding of RF/EMF/bodily interaction complexities. He was part of the EMF working Group that wrote the diagnosis guidelines for Radiation Sickness. Prof. Yury Grigoriev, MD is Chairman, Russian National Committee on Non-Ionizing Radiation Protection.

22. Among the authors are three former Presidents (Blank, Blackman and Mild) and five full members of the prestigious Bioelectromagnetics Society (BEMS). One distinguished author is

the Chair of the Russian National Committee on Non-Ionizing Radiation (Grigoriev). Another is a former Senior Advisor to the European Environmental Agency (Gee).³ Three of the authors (Blackman, Hardell and Belyaev) were part of the 2011 IARC panel that classified RFR as a “Possible” (2B) human carcinogen. These are truly the leading scientists on this issue worldwide.

23. Additional BIR sections address policy issues including Summary for the Public and Conclusions (Section 1); Statement of the Problem (Section 2); The Existing Public Exposure Standards (Section 3); Evidence of Inadequacy of the Standards (Section 4); and Key Scientific Evidence and Public Health Policy Recommendations (Section 24).

24. The BIR has always been published as a website to make the information accessible to everyone without cost. In addition much of the 2007 BIR content was published in a special two-volume issue of the peer-reviewed journal, *Pathophysiology*.⁴ The public health chapter with slight revision was published after peer-review in *Reviews on Environmental Health* in 2008.

25. The 2007 BIR formed the basis for the European Parliament’s 2009 Resolution on “Health concerns associated with electromagnetic fields”⁵ calling for greater transparency relating to RFR exposure and adoption of precautionary measures.

26. The BIR 2012 update found stronger and more consistent scientific evidence for health harm, and at even lower exposure levels. The 2014 and 2017 updates continued to see this trend, and the evidence continues to get stronger each year.

27. The BIR alone (independent of all the other evidence presented to the FCC) demonstrates that any objective and unbiased review of the current science leaves no doubt that wireless technology has biological effects at non-thermal intensities. These exposures can be and are highly injurious to health at radiation intensities an order of magnitude below the FCC’s current guidelines, especially when the frequencies are pulsed and modulated.

28. My expert report advised the FCC that “The cost of doing nothing is unacceptable. Substantial evidence for health risks from chronic exposure to wireless technologies cannot be dismissed, and if we do nothing, it will simply worsen rates of chronic diseases, disability and premature mortality.” I also published two papers on the public health implications “*Human Health Effects of EMFs: The Cost of Doing Nothing*”⁶ and “*Electromagnetic Fields and Cancer: The Cost of Doing Nothing*.”⁷

29. The BIR conclusion urged the FCC to 1) recognize non-thermal health effects harms caused by constant and ever-growing RF emissions 2) adopt immediate measures to warn the public 3) develop concrete and biologically based guidelines based on “observed effects” in humans and 4) establish guidelines that take into account long-term chronic exposure to non-thermal effects of RF/EMF, including effects of pulsation modulation and peak exposures.

³ Full titles and affiliations of authors is in Section 25 of the BioInitiative Report at www.bioinitiative.org.

⁴ August 2009, *Pathophysiology* 16: 2,3.

⁵ Resolution (INI/2008/2211), <https://ecfsapi.fcc.gov/file/7521323876.pdf>.

⁶ <https://ecfsapi.fcc.gov/file/109303096909269/Carpenter.2010.Human%20health%20effects%20of%20EMFs.Cost%20of%20doing%20nothing.pdf>

⁷ January, 2010, *Reviews on environmental health* 25(1):75-80.

The FCC treatment.

30. The Commission dismissed the evidence in the record, including the BIR, without any substantive or scientific analysis.

31. The only discussion appears in *RF Order* ¶¶10-15 and the essence of it is in ¶12. The FCC made a conclusory statement that the evidence of harm was not persuasive.

32. The only explanation the FCC gave for rejecting the scientific and medical evidence of harm in the BIR was because it would allegedly require emissions levels so low that “No device could reliably transmit any usable level of energy by today’s technological standards while meeting those limits.”

33. The FCC guidelines are based on obsolete and disproven assumptions. In contrast the BIR 2012 recommended levels are goals that are based on actual effects found in humans. The BIR-recommended levels are based on an ‘observed effects level’ in individuals living near cell towers.

34. It is important to note that the BIR recommended goals, not regulatory standards. It is true that achieving such low exposure levels and developing safer and less bio-active modulations levels would require effort on the part of the FCC and the telecom industry. However, the fact that achieving lower standards is difficult is not an excuse to deny the evidence of harm at current exposure levels.

35. I advised the FCC that the responsible action would be to accept and admit that non-thermal RF/EMF poses danger to human health. I asked the FCC to take immediate action to reduce exposures to the greatest degree that can be accomplished without undue social disruption. As in every situation where public health confronts economic and social barriers, one must balance cost vs. benefit. But the first step for responsible action is to stop denying the scientific facts and the evidence of human injuries.

The FCC’s Guidelines

36. The FCC’s 1996 guidelines are entirely based on the fallacious assumption that the only effects from exposure to non-ionizing EMFs can occur from levels that create tissue heating, a concept known as the “thermal effect.” The FCC guidelines do not even protect from thermal effects from long-term exposure. They look at only 30 minutes of exposure and from only one source of radiation.

37. To ensure the “safety” of wireless devices, the FCC is using a mannequin head which approximates the size of a head of a 6 foot, 220-pound man. It is filled with liquid, supposedly to simulate brain tissue. The mannequin measures the absorption of “heat” from the RFR in the brain. Mannequins do not have brains, and human brains are an extremely complex bioelectrical organ, not liquid. Exposure to RF/EMFs could induce chemical, physiological, psychological and behavioral effects in the brain that have nothing to do with heat absorption. The effects are documented in brain scans, functional MRIs, SPECT scans and EEGs. For example, human EEG studies reveal the effects of RF/EMFs on brain physiology, alpha brain waves, cortical activity, brain synchronization, sleep and epileptic seizures. Studies show effects on cognitive functions, sleep, memory, learning, perception, vision, motor abilities and auditory effects. Studies also showed impaired blood flow to the brain, damage to the Blood Brain Barrier and metabolic effects in humans. There is also evidence of effects on brain glucose metabolism.

38. Pulsed and modulated EMFs have been successfully used for medical purposes for many years. BIR Section 17 addressed “Evidence based on EMF Medical Therapeutics,” showing how pulsed EMFs have been used to promote bone healing after a fracture when all other efforts have failed. Pulsed EMFs are also used for chronic pain management. This every-day beneficial medical use belies the assumption behind the FCC standards.

39. The FCC guidelines do not even protect from exposure to thermal damage from peak exposures. The FCC “safety” measurements only protect from 30 minutes exposure and the exposure measurements are averaged. We advised the FCC that its failure to address this issue is leading to sickness from “Smart Meters.” Smart meters are wireless transmitting devices that record electricity usage and wirelessly send that information to the utility. These meters have been installed on homes, sometimes without people’s knowledge or permission. They send a cluster of very brief but extremely high intensity pulses, repeated multiple times a minute, 24/7 continuously, sometimes up to 190,000 pulses a day. While the average intensity over periods of time is not particularly high, many people have been injured by smart meters. The very high intensity pulses would likely exceed FCC thermal guidelines if maintained, but because of the FCC “averaging,” the real exposure levels are obscured. EMF pulses are known to be bioactive (to have effects on living tissue). Despite many complaints by individuals who have been injured from these meters, and despite the evidence provided by the BIR and other experts, the FCC has done nothing to address the problem and completely ignored them in its decision. For years now I have received desperate pleas from the injured who cannot even be in their own home. I have written letters, provided expert opinions and traveled extensively, trying to support them with legislators or in courts. Because of the FCC decision, I will have to continue and work to support their efforts, but I am not sure what more can be done. This is why I joined this Petition.

40. The current radiation levels may even be a quintillion-times higher than what humans have evolved to tolerate. See exhibit 3. The FCC’s guidelines completely fail to protect the public from current real exposures - from constant exposure to RFR/EMFs from numerous sources, operating on different frequencies and using different pulsations and modulations. They test for only one device for 30 minutes. No tests using pulsation and modulations are required, though this is what people encounter in the real world.

41. The BIR established that the FCC’s thermal assumption is invalid. It has been disproven, and the SAR levels are completely irrelevant to assess the effects of existing exposures and protect the public’s health. The FCC failure not only does not protect the public; it has actually been creating harm. I see it every day in my work.

42. The human evidence of the failure and irrelevance of the FCC guidelines are most apparent from the growing reports of Radiation Sickness, also known as “microwave illness,” “microwave syndrome” or “electro-hypersensitivity.” The sickness is growing but is largely an ignored public health problem.

43. The syndrome consists mainly of neurological symptoms, including headaches, fatigue, cognitive dysfunction, ringing in the ears, and often cardiac arrhythmias. Radiation Sickness is likely the most immediate and widespread manifestation of the harm from exposure to wireless emissions within the FCC’s current limits. Many studies have shown that Radiation Sickness symptoms can be caused by exposure to RF/EMFs. Studies also suggest these symptoms indicate serious physiological injuries such as impaired blood flow to the brain, BBB leakage and oxidative stress.

44. The first reports of this sickness started decades ago. U.S. soldiers were exposed to RF systems and radar. At the time, only military personnel and a few professionals were exposed to the RFR levels that are now inflicted on the entire civilian population. I published two papers on the history of the condition: *Excessive exposure to radiofrequency electromagnetic fields may cause the development of a syndrome of electro-hypersensitivity*⁸ and *“The microwave syndrome or electro-hypersensitivity: Historical background.”*⁹

45. For over a decade I have been approached by growing numbers of people. They or their children have developed the sickness and they are desperate. It is becoming a health and human rights crisis. Some of this illness could have been avoided if the public had been warned about the potential effects. Instead, because of FCC assurances of safety, people who are suffering from Radiation Sickness often don't know that it is their wireless devices that are the cause of their symptoms and problems. Doctors are often unaware of the science and misdiagnose their patients and give them incorrect treatment and unnecessary medications. Children are getting psychiatric medications for ADHD while for many turning off the Wi-Fi router would solve their problem.

46. As a doctor who dedicated his life to public health, I have been working tirelessly to raise public awareness and to educate public health professionals about the RF harms and the resulting sickness. Because of the FCC's failures, denial of harm, and its insistence to force even more of this toxic radiation on the public I will have to continue to work to help protect the public not only from RF/EMFs, but also from the FCC.

Response to The FCC Claims

47. The FCC summarily dismissed all the evidence in the BIR and pretended none of it was convincing or reliable. *RF Order* ¶10 states “we find no appropriate basis for and thus decline to initiate a rulemaking to reevaluate the existing RF exposure limits. This decision is supported by our expert sister agencies, and the lack of data in the record to support modifying our existing exposure limits.”

48. **Claim 1: “Sister Agencies” Support:** The FCC referred to “sister agencies,” but the only agency that meaningfully participated was the Food and Drug Administration (FDA). The director of the FDA Center for Devices and Radiological Health filed a letter in April 2019 stating that “no changes to the current standards are warranted at this time.” In one short paragraph, without any meaningful analysis or explanation, he rejected all the science.

49. This rejection is astounding considering the FDA commissioned the National Toxicology Program (NTP) of the National Institute of Environmental and Health Science (NIEHS) to conduct a study that would provide definitive answers relating to health implications from wireless emissions. The NTP study was designed to address long-term exposure to non-thermal levels of RFR similar to those from using a cell phone. The study found clear evidence of carcinogenic effect. The cancers in rodents were gliomas of the brain and Schwannomas, the

⁸ *Excessive exposure to radiofrequency electromagnetic fields may cause the development of a syndrome of electro-hypersensitivity*; Altern Ther Health Med. 2014;20(6):40-42.

⁹ *“The microwave syndrome or electro-hypersensitivity: Historical background*; Reviews on Environmental Health 30: 217-222: 2015.

same tumor that causes acoustic neuromas of the auditory nerve. Some additional cancers were seen from whole body exposure, not just the head. It also confirmed the effects of modulation. Very importantly, the NTP studies also demonstrated clear damage to DNA which can be a precursor for the development of cancer.

50. The Ramazzini Institute in Italy performed a similar study, but one where the intensity of exposure to the rodents was at the levels similar to those that humans would be exposed to if they live near a cell tower. This study, even though conducted at a much lower intensity, confirmed the development of the same two cancers seen in the NTP results. These studies, combined with other animal and epidemiological studies, leave no room for doubt regarding the carcinogenic effects and DNA damage of RFR.

51. In 2011, the International Agency for Research on Cancer (IARC), a part of the World Health Organization (WHO) which is assigned with the classification of carcinogens, classified non-thermal RFR from cell-phones, Wi-Fi, cell towers and other sources of RF as a “Possible” (2B) Carcinogen. Considering the relatively short time we have been using wireless technology and the long time it takes cancer to develop, a 2B carcinogen classification at that time should have been alarming. IARC explained that while there was epidemiological evidence for a higher classification, more animal studies were needed. The NTP and Ramazzini Institute studies have now established the missing link that held IARC back. But even so, the lower designation should have given the Commission pause, especially after the NTP and Ramazzini findings.

52. Nevertheless, the FDA director of the Department of Radiology and Devices rejected the conclusions of the \$25 million NTP study commissioned by his own office. Although the protocols of the study were confirmed by the FDA, he stated that the results “should not be applied to humans.” This position was rejected by a panel of 11 experts that were appointed by the NIEHS. The FCC never explained why it decided to ignore all the independent experts, including many in government or appointed by government, who say the FCC regulations are based on false premises and are causing great harm.

53. **Claim 2: No evidence in the docket:** The FCC claims that “The record does not demonstrate that the science underpinning the current RF exposure limits is outdated or insufficient to protect human safety.” The BIR as well as hundreds of additional reports and studies published since the last BIR version (and referenced in the docket) completely contradict that claim. The FCC assertion is scientifically and factually indefensible.

54. **Claim 3: Evidence is not persuasive:** *RF Order* ¶12 states: “While the record includes some research information, there is no persuasive case in the record to evaluate the quality and significance of that research.” The BIR provides a strong and persuasive case showing the FCC guidelines are irrelevant and not evidence-based. It is the FCC that fails to provide any evidence, let alone “persuasive” evidence, to support its decision or claims.

55. **Claim 4: The Commission goes on to claim that “no scientific evidence establishes a causal link between wireless device use and cancer or other illnesses.”** We already know at least some of the causal mechanisms between RF/MW radiation and biological systems. The BIR reported that 90% of 225 studies show RF/EMF causes oxidative stress, an established mechanism of harm that can lead to cancer, non-cancer illnesses and DNA damage. Oxidative stress is the central mechanism leading to cancer, radiation sickness and neurological damage from RF/EMF. There is evidence of other related mechanisms of harm such as damage to cell

membranes, and mitochondria, which are the energy factories of our cells, and damage to the Blood Brain Barrier (BBB).

56. **Claim 5: Multi-agency consensus:** The FCC asserts it has support of “sister” agencies. One FDA department [REDACTED] position. The only agency with current expertise is the NTP, which is another arm of DHHS. The FDA had to contract with the NTP to perform the NTP cell phone study. When the EPA had experts on this issue, before its EMF program was defunded, EPA studies revealed harms. Dr. Carl Blackman, one of the BIR authors, participated in these studies. The EPA repeatedly advised the FCC that the current guidelines do not protect against long-term exposure to pulsed and modulated non-thermal levels RFR.

57. In the 50 years working in public health, I’ve seen numerous public health failures. Many are a result of government agencies’ reliance on industry-friendly science committees (think: Tobacco). The failure to protect the public health from wireless radiation is, in my opinion, the worst failure. Everyone is exposed and no one can any longer choose **not** to be exposed, even those who must not be exposed in order to be functional. The damage has manifested, and the sickness is all around us. Ignoring the evidence is merely increasing the size of an already gargantuan problem. This situation cannot and must not continue.

Standing

58. I have a direct and personal stake in this matter. First, and most fundamentally, I and my family are personally injured by EMF/RFR emissions pursuant to the FCC’s authority and within its guidelines. My wife suffers from a mild case of Radiation Sickness. When she is exposed to high levels of Wi-Fi she develops tinnitus (ringing in the ears) that goes away when she is not close to the source. I clearly understand the science showing this radiation adversely affects our cells and DNA with every minute of exposure. This damage over prolonged exposure can lead to illness. I personally object to the harmful bodily intrusions that constantly occur without my consent, and which are causing me direct personal injury. All the petitioners in this case are similarly injured.

59. The FCC’s and FDA’s denial of the science has been harmful to my reputation as a scientist. Scientists who have publicly acknowledged the harms are dismissed by FCC officials and called “conspiracy theorists” and even Russian or Chinese agents; our science is labelled “bogus.” I have personally been subjected to professional injury. In an article in the New York Times on July 16, 2019, entitled “The 5G Health Hazard that Isn’t,” William J. Broad implied that I was an agent of the Russian government only because I did an interview on RT America on the adverse health effects of cell phones. His article was found to have violated the truth and accuracy code of Ireland by the Press Ombudsman for the Press Council of Ireland. The BIR has been attacked as “unscientific” and “scientifically discredited.” The FCC has harmed my name, my professional integrity and my professionalism.

60. The FCC did not disclose its reasoning, if there even was any. The BIR research used and applied all the necessary protocols and tools for analysis. Much of it was peer-reviewed and published. Yet the FCC rejected it. I now have no idea what information the Commission deems relevant, or what it would take to secure the needed change. As a result, I cannot provide evaluation or analysis, or conduct research on the topic since I simply do not know what more to do. This materially impedes my ability to practice public health.

61. I am bound by professional ethics even though I am a public health practitioner and researcher rather than a clinical physician. My Hippocratic oath¹⁰ requires that I take all necessary steps to "prevent disease whenever I can, for prevention is preferable to cure." The AMA Code of Ethics has a section relating to medical research and innovation. Code of Medical Ethics Opinion 7.2.1 states that:

Physicians have an ethical responsibility to learn from and contribute to the total store of scientific knowledge. When they engage in biomedical or health research, physicians have obligations as scientists, which include disseminating research findings. Prompt presentation to scientific peers and publication of research findings are foundational to good medical care and promote enhanced patient care, early evaluation of clinical innovations, and rapid dissemination of improved techniques.¹¹

62. Opinion 7.2.1 recognizes that research and dissemination of findings is for the "ultimate benefit of patients," so my research is ultimately about how to care for individuals with health conditions, and actively preventing environmental conditions that harm human beings. My ethical duties require that I do everything in my power to expose the FCC's active suppression and denial of the science on this topic, because the bottom line is that the FCC's current standards threaten the population at large and are inflicting grave harm on large numbers of individuals who suffer from exposure-related sicknesses.

63. The FCC order did not adequately consider or reasonably respond to my or others' expert reports and comments. Their decision to retain existing guidelines entirely fails to resolve the problems caused by harmful radiation at currently permitted levels. These injuries and harms will continue until the rules are changed to take into account the needs of those who are or may become injured by electromagnetic radiation and to truly protect health and safety.

64. If the Court reverses and remands the order, the FCC will have to acknowledge the harm it has been causing, then craft standards that reduce or eliminate the harm. Changes to the FCC guidelines that would address non-thermal levels and modulated, pulsed signals will safeguard my life and the lives of others. A remand that requires the FCC to address the situation and allow accommodations for those who are already suffering and who need to avoid nonconsensual exposure to wireless radiation would significantly mitigate the harm.

65. This concludes my Affidavit.

I hereby swear or affirm, under penalty of perjury, that to the best of my knowledge and belief, the above averments are true. I acknowledge that this affidavit will be submitted as evidence in a court of law and that false statements may result in legal penalties.

David O. Carpenter 29 July 2020

¹⁰ "A Modern Hippocratic Oath" by Dr. Louis Lasagna, Dean, School of Medicine at Tufts University, 1964.

¹¹ Full text available at <https://www.ama-assn.org/delivering-care/ethics/principles-disseminating-research-results>.

[REDACTED]

Exhibit 1

AFFIDAVIT OF DAVID O. CARPENTER, MD IN SUPPORT OF STANDING

CURRICULUM VITAE

Name: David O. Carpenter

Home Address: [REDACTED]
Schenectady, New York 12303

Positions Held:

Director, Institute for Health and the Environment
University at Albany
Professor, Environmental Health Sciences
School of Public Health, University at Albany
5 University Place, A217, Rensselaer, NY 12144

Honorary Professor

Queensland Children's Medical Research Institute
University of Queensland
Brisbane, Australia

Education: 1959 B.A., Harvard College, Cambridge, MA
1964 M.D., Harvard Medical School, Boston, MA

Positions Held:

9/61-6/62 Research Fellow, Department of Physiology, University of Göteborg, Sweden with Professor Anders Lundberg

7/64-6/65 Research Associate, Department of Physiology, Harvard Medical School, Boston, MA under the direction of Dr. Elwood Henneman

7/65-2/73 Neurophysiologist, Laboratory of Neurophysiology, National Institutes of Mental Health, Dr. Edward V. Evarts, Chief, Assistant Surgeon, USPHS, currently a Reserve Officer in the USPHS.

2/73-3/80 Chairman, Neurobiology Department Armed Forces Radiobiology Research Institute, Defense Nuclear Agency, Bethesda, MD

3/80-9/85 Director, Wadsworth Center for Laboratories and Research, New York State Department of Health, Albany, NY

9/85-1/98 Dean, School of Public Health, University at Albany

9/85-Pres. Professor, Departments of Environmental Health Sciences and Biomedical Sciences, School of Public Health, University at Albany.

9/85-7/98 Research Physician, Wadsworth Center for Laboratories and Research, New York State Department of Health, Albany, NY

1/98-1/05 Adjunct Professor in the Center for Neuropharmacology & Neuroscience, Albany Medical College, Albany, NY

2001-Pres. Director, Institute for Health and the Environment, University at Albany, SUNY, Rensselaer, NY. The Institute was named a Collaborating Center of the World Health Organization in 2011.

2005-2010 Senior Fellow, Alden March Bioethics Institute, Albany Medical College/Center, Albany, New York

2011-Pres. Honorary Professor, Queensland Children's Medical Research Institute, University of Queensland, Brisbane, Australia

Editor-in-Chief: Cellular and Molecular Neurobiology, 1981 – 1987
Editor-in Chief: Reviews on Environmental Health 2012-present
Editor-in-Chief: Environmental Pollution 2015-2019
Editorial Advisor: Cellular and Molecular Neurobiology, 1987 – Present
Academic Editor: Journal of Environmental and Public Health, 2009-2013
Academic Editor: PLoS ONE 2014-2016
Editorial Boards: Journal of Public Health Management and Practice, 1995 - 2002
International Journal of Occupational Medicine & Environmental Health
1996 – 2016
Journal of Alzheimer's Disease – Associate Editor, 2007-2009
Reviews on Environmental Health; 2008-2012
International Archives of Occupational and Environmental Health; 2009-present.
Environmental Health Perspectives, 2010-2017
Global Health Perspective, 2012-present
Environment International 2013-present
International Journal of Environmental Research and Public Health: 2019-present.

National and International Committees:

1978, 1981 Physiology Study Section (Ad hoc member)
 1979-1985 NIH International Fellowship Study Section
 1974-1981 Member, Steering Committee of the Section on the Nervous System, American Physiological Society (Chairman of the Committee, 9/76-4/80)
 1981-1989 Member, USA National Committee for the International Brain Research Organization
 1985-1986 Committee on Electric Energy Systems of the Energy Engineering Board, National Research Council
 1986-1987 Member, Neurophysiology Peer Panel for the National Aeronautics and Space Administration
 1987-1989 Member, Science Advisory Council of the American Paralysis Association
 1987-1990 Advisory Panel for the Electric Energy System Division, U.S. Department of Energy
 1985-1993 Committee #79, National Council on Radiation Protection and Measurements
 1986-1997 Member, Legislative and Education Committees, Association of Schools of Public Health
 1989-1994 Member, Neuroscience Discipline Working Group, Life Sciences Division of the NASA
 1994, 1995 Federation of American Societies for Experimental Biology Consensus Conference on FY 1995 Federal Research Funding
 1994-1997 Member, Legislative Committee of the Association of Schools of Public Health
 1997 Member, Executive Committee of the Association of Schools of Public Health
 1997-2000 National Advisory Environmental Health Sciences Council of the National Institutes of Health
 1998-2015. Member, U.S. Section of the Great Lakes Science Advisory Board of the International Joint Commission
 2000-Pres. Member, Board of Directors, Pacific Basin Consortium for Hazardous Waste Health and Environment; Treasurer, 2001-2004, 2008-pres; Chair, 2004-2008
 2001-2008 United States Co-Chair, Workgroup on Ecosystem Health of the Science Advisory Board of the International Joint Commission
 2002-2003 Member, Committee on the Implications of Dioxin in the Food Supply, The National Academies, Institute of Medicine
 2001-Pres. Member, Board of Directors, Alliance for Public Health and Associates, Inc.
 2003-2008 Member, United States Environmental Protection Agency, Children's Health Protection Advisory Committee
 2003-2012 Chair, Advisory Committee to the World Health Organization and National Institute of Environmental Health Sciences on collaborative activities.
 2004-2012 Member, Blue Ocean Institute Curriculum Advisory Board.

2007-2011 Chair, Workgroup on Risks vs. Benefits of Fish Consumption, Science Advisory Board, International Joint Commission.
 2013 Invited Expert, International Agency for Research on Cancer, Panel for Monograph 107, Carcinogenicity of Polychlorinated Biphenyls.
 2013-Pres. Member, Global Burden of Disease Panel

State and Local Committees:

1980-1987 Executive Secretary, New York State Power Lines Project
 1985-1989 Board of Scientific Advisors, Institute of Basic Research, OMRDD, N.Y.
 1986-1989 Member, Steering Committee, Health Policy and Administrative Consortium of the Capital District
 1991-1992 Member, Connecticut Academy of Sciences and Engineering Committee on Electromagnetic Field Health Effects
 1991-1992 Member, Board of Directors of the Capital District Chapter of the Alzheimer's Disease and Related Disorders Association, Inc.
 1991-1992 Member, State Task Force for the Reform of Middle Level Education in NY State
 1992-1993 Member, State Needs Task Force on Health Care and Education
 1987-1998 Delegate-at-Large, New York State Public Health Association
 1991-1995 Member, Board of Directors of the Capital District Amyotrophic Lateral Sclerosis Association
 1994 Chair, Council of Deans, University at Albany, SUNY
 1997-2008. Member, Board of Directors, (Chair 1998-2004) Albany-Tula Inc.: A Capital Region Alliance
 2000-Pres. Member, Board of Directors, Healthy Schools Network, Inc.
 2000-2003 Member, Medical Advisory Board, Hepatitis C Coalition, New York
 2000-2004 Member, Environmental Protection Agency /National Association of State Universities and Land Grant Colleges Task Force
 2001-2008 Member, Board of Directors, Environmental Advocates of New York
 2004-2007 Member, Ad Hoc Advisory Group on Brownfield Cleanup Standards
 2005-Pres. Member, Schooling Chefs Curriculum Advisory Board
 2005-Pres. Member, Advisory Board, Healthy Child Healthy World
 2005-2008 Member, Board of Directors, Citizens Environmental Coalition
 2006-2009 Member, Board of Directors, Marine Environmental Research Institute
 2007-2009 Member, New York State Renewable Energy Task Force
 2013-2015 Member, Medical Society of the State of New York (MSSNY)
 2013-2015 Member, Preventive Medicine and Family Health Committee, MSSNY
 2014-Pres. Member, Board of Directors, Regenerative Research Foundation
 2014-Pres. Member, Board of Directors, International Institute for Health and Education

Honors, Awards and Fellowships:

1959 B.A. awarded magna cum laude. Thesis entitled "Metamorphosis of visual pigments: A study of visual system of the salamander, Ambystoma tigrinum" (Thesis advisor, Professor George Wald)
 Elected to Phi Beta Kappa and to Sigma Xi
 1964 M.D. awarded cum laude for a thesis in a special field. Thesis entitled "Electrophysiological observations on the importance on neuron size in determining responses to excitation and inhibition in motor and sensory systems" (Thesis advisor, Dr. Elwood Henneman)
 1964 Awarded the Leon Resnick Prize given to a Harvard Medical School graduate showing promise in research
 1970 Awarded the Moseley Traveling Fellowship for study in England (Fellowship declined)
 1971 Invited as Visiting Professor of Physiology, Centro de Investigacion y de Estudios

- Avanzados, del Institute Politecnico Nacional, Mexico 14, D.F., Mexico, for 3 months
- 1982, 1986 Visiting Professor of Physiology, Department of Physiology, Kyushu University, Fukuoka, Japan, for a period of three months each
- 1987
- 1989 Awarded Jacob Davis Neuroscience Investigator Award from the National Institute of Neurological and Communicative Diseases and Stroke
- 1999 Awarded Homer N. Calver Award from the American Public Health Association for studies in environmental health.
- 2001 Awarded 2001 Academic Laureate from the University at Albany Foundation.
- 2010 Awarded the Albion O. Bernstein, M.D. Award in recognition of an outstanding contribution to public health and the prevention of disease through lifelong research of environmental health hazards and for limitless devotion to medical education by the Medical Society of the State of New York.
- 2011 Awarded the Rodney Wylie Eminent Visiting Fellowship 2011 at the University of Queensland, Brisbane, Australia for a period of four weeks.
- 2013 Awarded the Annual Kenneth V. Dodgson, M.D., Lectureship at the University of Rochester Department of Occupational and Environmental Medicine Grand Rounds.
- 2019 Received the Third Age Achievement Award for Education, given by Senior Services of Albany
- 2020 Awarded the Theo Colborn Career Achievement Award for Research and Advocacy in Environmental Health by the Environmental Health Symposia.

Federal Grants Held: (Principal Investigator Only)

- 1980-1983 United States Air Force, "Mechanisms of Radiation-Induced Emesis in Dogs", \$76,847 total direct costs.
- 1982-1988 National Institute of Health, "Mechanisms of Desensitization at Central Synapses", \$464,786 total direct costs.
- 1984-1986 Defense Nuclear Agency, "Mechanisms of Radiation-Induced Emesis in Dogs", \$330,504 total direct costs.
- 1986-1996 National Institute of Health, "Mechanisms of Excitatory Amino Acids Actions and Toxicity", 1986-1989 \$231,848 total direct costs; 1990-1996 \$562,926 total direct costs.
- 1989-1993 National Institute of Health, "Mechanisms of Lead Neurotoxicity" \$373,576 total direct costs
- 1990-1995 National Institute of Environmental Health Sciences, Superfund Basic Research Program, "Multidisciplinary Study of PCBs and PCDFs at a Waste Site", D.O. Carpenter, P.I. \$5,783,419 total direct costs.
- 1995-2001 Fogarty International Center, National Institutes of Health, International Training Program in Environmental and Occupational Health. A Central/Eastern European Environ/Occup Training Program, D.O. Carpenter, P.I. \$657,520 total costs.
- 1995-2001 National Institute of Environmental Health Sciences, Superfund Basic Research Program, "Multidisciplinary Study of PCBs," D.O. Carpenter, P.I. \$12,653,709 total direct costs.
- 1998-1999 Environmental Protection Agency, A Indoor Air Risk at Akwesasne - Pilot Project, D.O. Carpenter, P.I. \$9,996 total costs.
- 2000-2002 Association Liaison Office for University Cooperation in Development, A Cooperative Program in Environmental Health between the Institute of Public Health at Makerere

- University, Kampala, Uganda and the School of Public Health, University at Albany, USA@, D.O. Carpenter, P.I. \$96,432 total costs.
- 2001-2007 Fogarty International Center, National Institutes of Health, International Training Program in Environmental and Occupational Health. A Multidisciplinary Environmental Health Training@, D.O. Carpenter, P.I. \$850,000 total costs.
- 2006-2011 Pakistan-US Science and Technology Cooperative Program (US National Academy of Sciences). "Association of particulate matter with daily morbidity in an urban population," D.O. Carpenter, P.I., \$391,104 total costs.
- 2009-2013 Exploratory Center on Minority Health and Health Disparities in Smaller Cities. Project 2: Environmental contaminants and reproductive health of Akwesasne Mohawk women. \$387,825 for year 1. D.O. Carpenter, Co-PI.
- 2010-2013 Department of the Army, "Gulf War Illness: Evaluation of an Innovative Detoxification Program: D.O. Carpenter, P.I., \$636,958 total costs.
- 2010-2013 Higher Education for Development of the United States Agency for International Development, "Drinking Water Supply, Sanitation, and Hygiene Promotion : Health Interventions in Two Urban Communities of Kampala City and Mukono Municipality, Uganda". D. O. Carpenter, P.I., \$299,736 total costs.
- 2011-2016 National Institute of Environmental Health Sciences (1RO1ES019620), "Protecting the health of future generations: Assessing and preventing exposures." PK Miller, FA von Hippel, CL Buck and DO Carpenter, Co-P.I.s, \$471,521 for the period 8/08/11-4/30/12, \$2,354,871 for the period 2011-2016.
- 2017-2022 National Institute of Environmental Health Sciences (2RO1ES19620-06A1), "Protecting the Health of Future Generations: Assessing and Preventing Exposures to Endocrine-Disrupting Flame Retardant Chemicals & PCBs in Two Alaska Native Arctic communities on St. Lawrence Island." PK Miller, FA von Hippel, CL Buck and DO Carpenter, Co-PIs. \$554,464 for the period 2018,

Research Interests:

- Exposure to persistent organic pollutants and risk of diabetes, cardiovascular disease, and hypertension.
- Cognitive and behavioral effects of environmental contaminants on children (IQ, ADHD) and older adults (dementias, Parkinson's Disease and ALS).
- Ionizing and non-ionizing radiation biology.
- Effects of air pollution on respiratory and cardiovascular function.

Other Professional Activities:

Host, The Public Radio Health Show (a 30 min public health information show carried on 170+ stations nationwide), plus the Armed Forces Radio Network and Voice of America, 1985-2001.

Authored a biweekly health column in The Troy Record, a local newspaper, 1997-1999.

Member of the Ethics Board, Town of Guilderland, 2013 – 2018

Albany Mayor's Advisory Committee on Air Pollution in the South End, 2016-present.

Board member and treasurer: Health Schools Network, 200-present.

Board member: Regenerative Research Foundation; 2010-present

Board member: National Toxic Encephalopathy Foundation, 2019 – present.

Board member: RADIX Ecological Sustainability Center, 2018-present.

Major Peer-Reviewed Publications:

1. Carpenter, D.O., Lundberg, A. and Norrsell, U. Effects from the pyramidal tract on primary afferents and on spinal reflex actions to primary afferents. Experientia, 18:337, 1962.
2. Carpenter, D.O., Engberg, I. and Lundberg, A. Presynaptic inhibition in the lumbar cord evoked from the brain stem. Experientia, 18:450, 1962.
3. Carpenter, D.O., Lundberg, A. and Norrsell, U. Primary afferent depolarization evoked from the sensorimotor cortex. Acta Physiol. Scand., 59:126-142.
4. Carpenter, D.O., Engberg, I., Funkenstein, H. and Lundberg, A. Decerebrate control of reflexes to primary afferents. Acta Physiol. Scand., 59:424-437, 1963.
5. Carpenter, D.O., Engberg, I. and Lundberg, A. Differential supraspinal control of inhibitory and excitatory actions from the FRA to ascending spinal pathways. Acta Physiol. Scand., 63:103-110, 1965.
6. Henneman, E., Somjen, G.G. and Carpenter, D.O. Excitability and inhibibility of motoneurons of different sizes. J. Neurophysiol., 28:599-620, 1965.
7. Henneman, E., Somjen, G.G. and Carpenter, D.O. Functional significance of cell size in spinal motoneurons. J. Neurophysiol., 28:560-580, 1965.
8. Somjen, G.G., Carpenter, D.O. and Henneman, E. Selective depression of alpha motoneurons of small size by ether. J. Pharmacol., 148:380-385, 1965.
9. Somjen, G., Carpenter, D.O. and Henneman, E. Response of motoneurons of different sizes to graded stimulation of supraspinal centers of the brain. J. Neurophysiol., 28:958-965, 1965.
10. Carpenter, D.O., Engberg, I. and Lundberg, A. Primary afferent depolarization evoked from the brain stem and the cerebellum. Arch. Ital. Biol., 104:73-85, 1966.
11. Carpenter, D.O. and Henneman, E. A relation between the threshold of stretch receptors in skeletal muscle and the diameter of axons. J. Neurophysiol., 29:353-368, 1966.
12. Carpenter, D.O. Temperature effects on pacemaker generation, membrane potential, and critical firing threshold in Aplysia neurons. J. Gen. Physiol., 50:1469-1484, 1967.
13. Chase, T.N., Breese, G., Carpenter, D., Schanberg, S. and Kopin, I. Stimulation-induced release of serotonin from nerve tissue. Adv. Pharmacol., 6A:351-364, 1968.
14. Carpenter, D.O. and Alving, B.O. A contribution of an electrogenic Na⁺ pump to membrane potential in Aplysia neurons. J. Gen. Physiol., 52:1-21, 1968.
15. Olson, C.B., Carpenter, D.O. and Henneman, E. Orderly recruitment of muscle action potentials. Arch. Neurol., 19:591-597, 1968.
16. Carpenter, D.O. Membrane potential produced directly by the Na⁺ pump in Aplysia neurons. Comp. Biochem. Physiol., 35:371-385, 1970.
17. Carpenter, D.O. and Gunn, R. The dependence of pacemaker discharge of Aplysia neurons upon Na⁺ and Ca⁺⁺. J. Cell. Physiol., 75:121-127, 1970.
18. Kraus, K.R., Carpenter, D.O. and Kopin, I. R. Acetylcholine-induced release of norepin-ephrine in the presence of tetrodotoxin. J. Pharmacol. Exp. Therap., 73:416-421, 1970.
19. Barker, J.L. and Carpenter, D.O. Thermosensitivity of neurons in the sensorimotor cortex of the cat. Science, 169:597-598, 1970.

20. Carpenter, D.O., Hovey, M.M. and Bak, A. Intracellular conductance of Aplysia neurons and squid axon as determined by a new technique. Intl. J. Neurosci., 2:35-48, 1971.
21. Carpenter, D.O., Breese, G., Schanberg, S. and Kopin, I. Serotonin and dopamine: Distribution and accumulation in Aplysia nervous and non-nervous tissues. Int. J. Neurosci., 2:49-56, 1971.
22. Hovey, M.M., Bak, A.F. and Carpenter, D.O. Low internal conductivity of Aplysia neuron somata. Science, 176:1329-1331, 1972.
23. Carpenter, D.O. Electrogenic sodium pump and high specific resistance in nerve cell bodies of the squid. Science, 179:1336-1338, 1973.
24. Carpenter, D.O. and Rudomin, P. The organization of primary afferent depolarization in the isolated spinal cord of the frog. J. Physiol. (Lond.), 229:471-493, 1973.
25. Shain, W., Green, L.A., Carpenter, D.O., Sytkowski, A.J. and Vogel, Z. Aplysia acetylcholine receptors: Blockage by and binding of α -bungarotoxin. Brain Res., 72:225-240, 1974.
26. Pierau, Fr.-K., Torrey, P. and Carpenter, D.O. Mammalian cold receptor afferents: Role of an electrogenic sodium pump in sensory transduction. Brain Res., 73:156-160, 1974.
27. Saavedra, J.M., Brownstein, M.J., Carpenter, D.O. and Axelrod, J. Octopamine: Presence in single neurons in Aplysia suggests neurotransmitter function. Science, 185:364-365, 1974.
28. Willis, J.A., Gaubatz, G.L. and Carpenter, D.O. The role of the electrogenic sodium pump in modulation of pacemaker discharge of Aplysia neurons. J. Cell. Physiol., 84:463-472, 1974.
29. Brownstein, M.J., Saavedra, J.M., Axelrod, J., Zeman, G.H. and Carpenter, D.O. Coexistence of several putative neurotransmitters in single identified neurons of Aplysia. Proc. Natl. Acad. Sci. (USA), 71:4662-4665, 1975.
30. Carpenter, D.O. and Gaubatz, G.L. Octopamine receptors on Aplysia neurons mediate hyperpolarization by increasing membrane conductance. Nature, 252:483-485, 1974.
31. Pierau, Fr.-K., Torrey, P. and Carpenter, D.O. Afferent nerve fiber activity responding to temperature changes of the scrotal skin of the rat. J. Neurobiol., 38:601-612, 1975.
32. Carpenter, D.O. and Gaubatz, G.L. H₁ and H₂ histamine receptors on Aplysia neurons. Nature, 254:343-344, 1975.
33. Carpenter, D.O., Hovey, M.M. and Bak, A.F. Resistivity of axoplasm. II. Internal resistivity of giant axons of squid and Myxicola. J. Gen. Physiol., 66:139-148, 1975.
34. Zeman, G.H. and Carpenter, D.O. Asymmetric distribution of aspartate in ganglia and single neurons of Aplysia. Comp. Biochem. Physiol., 52C:23-26, 1975.
35. Pierau, Fr.-K., Torrey, P. and Carpenter, D.O. Effect of ouabain and potassium-free solution on mammalian thermosensitive afferents in vitro. Pflugers Arch., 359:349-356, 1975.
36. Swann, J.W. and Carpenter, D.O. The organization of receptors for neurotransmitters on Aplysia neurons. Nature, 258:751-754, 1975.
37. Yarowsky, P.J. and Carpenter, D.O. Aspartate: distinct receptors on Aplysia neurons. Science, 192:806-809, 1976.
38. Foster, K.R., Bidinger, J.M. and Carpenter, D.O. The electrical resistivity of aqueous cytoplasm. Biophys. J., 16:991-1001, 1976.
39. Carpenter, D.O., Greene, L.A., Shain, W. and Vogel, Z. Effects of eserine and neostigmine on the interaction of α -bungarotoxin with Aplysia acetylcholine receptors. Mol. Pharmacol., 12:999-1006, 1976.
40. Saavedra, J.M., Ribas, J., Swann, J. and Carpenter, D.O. Phenylethanolamine: A new putative neurotransmitter in Aplysia. Science, 195:1004-1006, 1977.

41. Carpenter, D.O., Swann, J.W. and Yarowsky, P.J. Effect of curare on responses to different putative neurotransmitters in Aplysia neurons. J. Neurobiol., 8:119-132, 1977.
42. Yarowsky, P.J. and Carpenter, D.O. GABA mediated excitatory responses on Aplysia neurons. Life Sci., 20:1441-1448, 1977.
43. Willis, J.A., Myers, P.R. and Carpenter, D.O. An ionophoretic module which controls electroosmosis. J. Electrophysiol. Tech., 6:34-41, 1977.
44. Yarowsky, P.J. and Carpenter, D.O. Receptors for gamma-aminobutyric acid (GABA) on Aplysia neurons. Brain Res., 144:75-94, 1978.
45. Carpenter, D.O., Gaubatz, G., Willis, J.A. and Severance, R. Effects of irradiation of Aplysia pacemaker neurons with 20 MeV electrons. Rad. Res., 76:32-47, 1978.
46. Yarowsky, P.J. and Carpenter, D.O. A comparison of similar ionic responses to gamma-aminobutyric acid and acetylcholine. J. Neurophysiol., 41:531-541, 1978.
47. Blum, B., Auker, C.R. and Carpenter, D.O. A head holder and stereotaxic device for the rattlesnake. Brain Res. Bull., 3:271-274, 1978.
48. Swann, J.W., Sinback, C.N. and Carpenter, D.O. Dopamine-induced muscle contractions and modulation of neuromuscular transmission in Aplysia. Brain Res., 157:167-172, 1978.
49. Swann, J.W., Sinback, C.N. and Carpenter, D.O. Evidence for identified dopamine motor neurons to the gill of Aplysia. Neurosci. Lett., 10:275-280, 1978.
50. Kebabian, P.R., Kebabian, J.W. and Carpenter, D.O. Regulation of cyclic AMP in heart and gill of Aplysia by the putative neurotransmitters, dopamine and serotonin. Life Sci., 24:1757-1764, 1979.
51. Carpenter, D.O. Interchangeable association of neurotransmitter receptors with several ionophores. Brain Res. Bull., 4:149-152, 1979.
52. Pellmar, T.C. and Carpenter, D.O. Voltage-dependent calcium current induced by serotonin. Nature, 277:483-484, 1979.
53. Ruben, P.C., Swann, J.W. and Carpenter, D.O. Neurotransmitter receptors on gill muscle fibers and the gill peripheral nerve plexus in Aplysia. Canad. J. Physiol. Pharmacol., 57:1088-1097, 1979.
54. Pellmar, T.C. and Carpenter, D.O. Serotonin induces a voltage-sensitive calcium current in neurons of Aplysia californica. J. Neurophysiol., 44:423-439, 1980.
55. Parver, L.M., Auker, C. and Carpenter, D.O. Choroidal blood flow as a heat dissipating mechanism in the macula. Am. J. Ophthalmol., 89:641-646, 1980.
56. Mell, L.D., Jr. and Carpenter, D.O. Fluorometric determination of octopamine in tissue homogenates by high-performance liquid chromatography. Neurochem. Res., 5:1089-1096, 1980.
57. Braitman, D.J., Auker, C.R. and Carpenter, D.O. Thyrotropin-releasing hormone has multiple actions in cortex. Brain Res., 194:244-248, 1980.
58. Meszler, R.M., Auker, C.R. and Carpenter, D.O. Fine structure and organization of the infrared receptor relay, the lateral descending nucleus of the trigeminal nerve in pit vipers. J. Comp. Neurol., 196:571-584, 1981.
59. Auker, C.R., Parver, L.M., Doyle, T. and Carpenter, D.O. Choroidal blood flow: I. Ocular tissue temperature as a measure of flow. Arch. Ophthalmol., 100:1323-1326, 1982.
60. Parver, L.M., Auker, C., Carpenter, D.O. and Doyle, T. Choroidal blood flow: II. Reflexive control in the monkey. Arch. Ophthalmol., 100:1327-1330, 1982.
61. Hori, N., Auker, C.R., Braitman, D.J. and Carpenter, D.O. Lateral olfactory tract transmitter: Glutamate, aspartate or neither? Cell. Mol. Neurobiol., 1:115-120, 1981.

62. Scappaticci, K.A., Dretchen, K.L., Carpenter, D.O. and Pellmar, T.C. Effects of furosemide on neural mechanisms in Aplysia. J. Neurobiol., 12:329-341, 1981.
63. Pellmar, T.C. and Carpenter, D.O. Cyclic AMP induces a voltage-dependent current in neurons of Aplysia californica. Neurosci. Lett., 22:151-157, 1981.
64. Parver, L., Auker, C. and Carpenter, D.O. Stabilization of macular temperature: The stabilizing effect of the choroidal circulation on the temperature environment of the macula. Retina, 2:117-120, 1982.
65. Green, R.W. and Carpenter, D.O. Biphasic responses to acetylcholine in mammalian reticulospinal neurons. Cell. Molec. Neurobiol., 1:401-405, 1981.
66. Hori, N., Auker, C.R., Braitman, D.J. and Carpenter, D.O. Pharmacologic sensitivity of amino acid responses and synaptic activation of in vitro prepyriform neurons. J. Neurophysiol., 48:1289-1301, 1982.
67. Slater, N.T. and Carpenter, D.O. Blockade of acetylcholine-induced inward currents in Aplysia neurons by strychnine and desipramine: effect of membrane potential. Cell. Molec. Neurobiol., 2:53-58, 1982.
68. Swann, J.W., Sinback, C.N., Pierson, M.G. and Carpenter, D.O. Dopamine produces muscle contractions and modulates motoneuron-induced contractions in Aplysia gill. Cell. Molec. Neurobiol., 2:291-308, 1982.
69. Swann, J.W., Sinback, C.N., Keabian, P.R. and Carpenter, D.O. Motoneurons which may utilize dopamine as their neurotransmitter. Cell. Molec. Neurobiol., 2:309-324, 1982.
70. Auker, C.R., Meszler, R.M. and Carpenter, D.O. Apparent discrepancy between single unit activity and ¹⁴C-deoxyglucose labelling in the optic tectum of the rattlesnake. J. Neurophysiol., 49:1504-1516, 1983.
71. Slater, N.T., Carpenter, D.O., Freedman, J.E. and Snyder, S.H. Vipoxin both activates and antagonizes three types of acetylcholine response in Aplysia neurons. Brain Res., 278:266-270, 1983.
72. French-Mullen, J.M.H., Hori, N., Nakanishi, H., Slater, N.T. and Carpenter, D.O. Assymmetric distribution of acetylcholine receptors and M channels on prepyriform neurons. Cell. Molec. Neurobiol., 3:163-182, 1983.
73. Carpenter, D.O., Briggs, D.B. and Strominger, N. Responses of neurons of canine area postrema to neurotransmitters and peptides. Cell. Molec. Neurobiol., 3:113-126, 1983.
74. Slater, N.T. and Carpenter, D.O. Blocking kinetics at excitatory acetylcholine responses on Aplysia neurons. Biophys. J., 45:24-25, 1984.
75. Chesnut, T.J. and Carpenter, D.O. Two-component desensitization of three types of responses to acetylcholine in Aplysia. Neurosci. Lett., 39:285-290, 1983.
76. Haas, H.L., Jeffreys, J.G.R., Slater, N.T. and Carpenter, D.O. Modulation of low calcium induced field bursts in the hippocampus by monoamines and cholinomimetics. Pflugers Arch., 400:28-33, 1984.
77. Parvar, L.M., Auker, C.R. and Carpenter, D.O. Choroidal blood flow. III. Reflexive control in human eyes. Arch. Ophthalmol., 101:1604-1606, 1983.
78. Slater, N.T., Haas, H.L. and Carpenter, D.O. Kinetics of acetylcholine-activated cation channel blockade by the calcium antagonist D-600 in Aplysia neurons. Cell. Molec. Neurobiol., 3:329-344, 1983.
79. McCreery, M.J. and Carpenter, D.O. Modulation of neuronal responses to L-glutamate in Aplysia. Cell. Molec. Neurobiol., 4:91-95, 1984.

80. Carpenter, D.O., Briggs, D.B. and Strominger, N. Peptide-induced emesis in dogs. Behav. Brain Res., 11:277-281, 1984.
81. ffrench-Mullen, J.M.H., Hori, N. and Carpenter, D.O. N-methyl-D-aspartate and L-aspartate activate distinct receptors in prepyriform cortex. Cell. Molec. Neurobiol., 4:185-189, 1984.
82. Slater, N.T. and Carpenter, D.O. A study of the cholinolytic actions of strychnine using the technique of concentration jump relaxation analysis. Cell Molec Neurobiol 4:263-271,1984.
83. Slater, N.T., Hall, A.F. and Carpenter, D.O. Kinetic properties of cholinergic desensitization in *Aplysia* neurons. Proc. Roy. Soc. Lond. B, 223:63-78, 1984.
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88. ffrench-Mullen, J.M.H., Koller, K., Zaczek, R., Coyle, J.T., Hori, N. and Carpenter, D.O. N-acetylasparylglutamate: Possible role as the neurotransmitter of the lateral olfactory tract. Proc. Nat. Acad. Sci., 82:3897-3900, 1985.
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96. Leung, M.K., S.-Rozsa, K., Hall, A., Kuruvilla, S., Stefano, G.B. and Carpenter, D.O. Enkephalin-like substance in *Aplysia* nervous tissue and actions of leu-enkephalin on single neurons. Life Sci., 38:1529-34, 1986.
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99. Carpenter, D.O., Briggs, D.B., Knox, A.P. and Strominger, N.L. Radiation-induced emesis in the dog: Effects of lesions and drugs. Rad. Res., 108:307-316, 1986.

100. Briggs, D.B. and Carpenter, D.O. Excitation of neurons in the canine area postrema by prostaglandins. Cell. Molec. Neurobiol., 6:421-426, 1986.
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105. Oyama, Y., King, W.M. and Carpenter, D.O. Edrophonium-induced membrane current in single neurons physically isolated from Aplysia californica. Brain Res., 438:95-100, 1988.
106. Jahan-Parwar, B., S.-Rozsa, K., Salanki, J., Evans, M.L. and Carpenter, D.O. In vivo labeling of serotonin containing neurons by 5,7-dihydroxytryptamine in Aplysia. Brain Res., 426:173-178, 1987.
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Exhibit 2

AFFIDAVIT OF DAVID O. CARPENTER, MD IN SUPPORT OF STANDING

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter ² - uW/cm ²)	Reference
As low as (10 ⁻¹³) or 100 femtowatts/cm ²	Belyaev, 1997
5 picowatts/cm ² (10 ⁻¹²)	Grundler, 1992
0.1 nanowatt/cm ² (10 ⁻¹⁰) or 100 picowatts/cm ²	Belyaev, 1997
0.00034 uW/cm ²	Behari, 2006
0.0005 uW/cm ²	Velizarov, 1999
0.0006 - 0.0128 uW/cm ²	Oberfeld, 2004
0.0009 uW/cm ²	Stagg, 1997
0.003 - 0.02 uW/cm ²	Heinrich, 2010
0.003 to 0.05 uW/cm ²	Thomas, 2010
0.005 uW/cm ²	Mohler, 2010
0.005 - 0.04 uW/cm ²	Thomas, 2008
0.006 - 0.01 uW/cm ²	Buchner, 2012
0.01 - 0.11 uW/cm ²	Navarro, 2003

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter ² - uW/cm ²)	Reference
0.01 - 0.05 uW/cm ²	Adults (18-91 yrs) with short-term exposure to GSM cell phone radiation reported headache, neurological problems, sleep and concentration problems. Hutter, 2006
0.005 - 0.04 uW/cm ²	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated) Thomas, 2008
0.015 - 0.21 uW/cm ²	Adults exposed to short-term GSM 900 radiation reported changes in mental state (e.g., calmness) but limitations of study on language descriptors prevented refined word choices (stupified, zoned-out) Augner, 2009
0.05 - 0.1 uW/cm ²	RFR linked to adverse neurological, cardio symptoms and cancer risk Khurana, 2010
0.05 - 0.1 uW/cm ²	RFR related to headache, concentration and sleeping problems, fatigue Kundi, 2009
0.07 - 0.1 uW/cm ²	Sperm head abnormalities in mice exposed for 6-months to base station level RF/MW. Sperm head abnormalities occurred in 39% to 46% exposed mice (only 2% in controls) abnormalities was also found to be dose dependent. The implications of the pin-head and banana-shaped sperm head. The occurrence of sperm head observed increase occurrence of sperm head abnormalities on the reproductive health of humans living in close proximity to GSM base stations were discussed." Otitoloju, 2010
0.38 uW/cm ²	RFR affected calcium metabolism in heart cells Schwartz, 1990
0.8 - 10 uW/cm ²	RFR caused emotional behavior changes, free-radical damage by super-weak MWs Akoev, 2002
0.13 uW/cm ²	RFR from 3G cell towers decreased cognition, well-being Zwamborn, 2003
0.16 uW/cm ²	Motor function, memory and attention of school children affected (Latvia) Kolodynski, 1996
0.168 - 1.053 uW/cm ²	Irreversible infertility in mice after 5 generations of exposure to RFR from an 'antenna park' Magras & Zenos, 1997
0.2 - 8 uW/cm ²	RFR caused a two-fold increase in leukemia in children Hocking, 1996
0.2 - 8 uW/cm ²	RFR decreased survival in children with leukemia Hocking, 2000
0.21 - 1.28 uW/cm ²	Adolescents and adults exposed only 45 min to UMTS cell phone radiation reported increases In headaches. Riddervold, 2008

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter ² - uW/cm ²)	Reference
0.5 uW/cm ²	Significant degeneration of seminiferous epithelium in mice at 2.45 GHz, 30-40 min. Saunders, 1981
0.5 - 1.0 uW/cm ²	Wi-Fi level laptop exposure for 4-hr resulted in decrease in sperm viability, DNA fragmentation with sperm samples placed in petri dishes under a laptop connected via WI-FI to the internet. Avendano, 2012
1.0 uW/cm ²	RFR induced pathological leakage of the blood-brain barrier Persson, 1997
1.0 uW/cm ²	RFR caused significant effect on immune function in mice Fesenko, 1999
1.0 uW/cm ²	RFR affected function of the immune system Novoselova, 1999
1.0 uW/cm ²	Short-term (50 min) exposure in electrosensitive patients, caused loss of well-being after GSM and especially UMTS cell phone radiation exposure Eltiti, 2007
1.3 - 5.7 uW/cm ²	RFR associated with a doubling of leukemia in adults Dolk, 1997
1.25 uW/cm ²	RFR exposure affected kidney development in rats (in-utero exposure) Pyrrasopoulou, 2004
1.5 uW/cm ²	RFR reduced memory function in rats Nittby, 2007
2 uW/cm ²	RFR induced double-strand DNA damage in rat brain cells Kesari, 2008
2.5 uW/cm ²	RFR affected calcium concentrations in heart muscle cells Wolke, 1996
2 - 4 uW/cm ²	Altered cell membranes; acetylcholine-induced ion channel disruption D'Inzeo, 1988
4 uW/cm ²	RFR caused changes in hippocampus (brain memory and learning) Tattersall, 2001
4 - 15 uW/cm ²	Memory impairment, slowed motor skills and retarded learning in children Chiang, 1989
5 uW/cm ²	RFR caused drop in NK lymphocytes (immune function decreased) Boscolo, 2001
5.25 uW/cm ²	20 minutes of RFR at cell tower frequencies induced cell stress response Kwee, 2001
5 - 10 uW/cm ²	RFR caused impaired nervous system activity Dumansky, 1974
6 uW/cm ²	RFR induced DNA damage in cells Phillips, 1998

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
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Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter ² - uW/cm ²)	Reference
8.75 uW/cm ²	RFR at 900 MHz for 2-12 hours caused DNA breaks in leukemia cells Marinelli, 2004
10 uW/cm ²	Changes in behavior (avoidance) after 0.5 hour exposure to pulsed RFR Navakatikian, 1994
10 - 100 uW/cm ²	Increased risk in radar operators of cancer; very short latency period; dose response to exposure level of RFR reported. Richter, 2000
12.5 uW/cm ²	RFR caused calcium efflux in cells - can affect many critical cell functions Dutta, 1989
13.5 uW/cm ²	RFR affected human lymphocytes - induced stress response in cells Sarimov, 2004
14.75 uW/cm ²	RFR increased biomarker for cell division in glioma brain tumor cells Stagg, 1997
20 uW/cm ²	Increase in serum cortisol (a stress hormone) Mann, 1998
28.2 uW/cm ²	RFR increased free radical production in rat cells Yurekli, 2006
37.5 uW/cm ²	Immune system effects - elevation of PFC count (antibody producing cells) Veyret, 1991
45 uW/cm ²	Pulsed RFR affected serum testosterone levels in mice Forgacs, 2006
50 uW/cm ²	Cell phone RFR caused a pathological leakage of the blood-brain barrier in 1 hour Salford, 2003
50 uW/cm ²	An 18% reduction in REM sleep (important to memory and learning functions) Mann, 1996
60 uW/cm ²	RFR caused structural changes in cells of mouse embryos Somozy, 1991
60 uW/cm ²	Pulsed RFR affected immune function in white blood cells Stankiewicz, 2006
60 uW/cm ²	Cortex of the brain was activated by 15 minutes of 902 MHz cell phone Lebedeva, 2000
65 uW/cm ²	RFR affected genes related to cancer Ivaschuk, 1999
92.5 uW/cm ²	RFR caused genetic changes in human white blood cells Belyaev, 2005
100 uW/cm ²	Changes in immune function Elekes, 1996
100 uW/cm ²	A 24.3% drop in testosterone after 6 hours of CW RFR exposure Navakatikian, 1994

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure
(Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/cm ² - uW/cm ²)	Reference
120 uW/cm ²	A pathological leakage in the blood-brain barrier with 915 MHz cell RF Salford, 1994
500 uW/cm ²	Intestinal epithelial cells exposed to 2.45 GHz pulsed at 16 Hz showed changes in intercellular calcium. Somozy, 1993
500 uW/cm ²	A 24.6% drop in testosterone and 23.2% drop in insulin after 12 hrs of pulsed RFR exposure. Navakatikian, 1994

STANDARDS	
530 - 600 uW/cm ²	Limit for uncontrolled public exposure to 800-900 MHz ANSI/IEEE and FCC
1000 uW/cm ²	PCS STANDARD for public exposure (as of September 1,1997) FCC, 1996
5000 uW/cm ²	PCS STANDARD for occupational exposure (as of September 1, 1997) FCC, 1996
BACKGROUND LEVELS	
0.003 uW/cm ²	Background RF levels in US cities and suburbs in the 1990s Mantiply, 1997
0.05 uW/cm ²	Median ambient power density in cities in Sweden (30-2000 MHz) Hamnerius, 2000
0.1 - 10 uW/cm ²	Ambient power density within 100-200' of cell site in US (data from 2000) Sage, 2000

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

SAR (Watts/Kilogram)		Reference
0.000064 - 0.000078 W/Kg	Well-being and cognitive function affected in humans exposed to GSM-UMTS cell phone frequencies; RF levels similar near cell sites	TNO Physics and
0.00015 - 0.003 W/Kg	Calcium ion movement in isolated frog heart tissue is increased 18% (P<.01) and by 21% (P<.05) by weak RF field modulated at 16 Hz	Schwartz, 1990
0.000021 - 0.0021 W/Kg	Changes in cell cycle; cell proliferation (960 MHz GSM mobile phone)	Kwee, 1997
0.0003 - 0.06 W/Kg	Neurobehavioral disorders in offspring of pregnant mice exposed in utero to cell phones - dose-response impaired glutamatergic synaptic transmission onto layer V pyramidal neurons of the prefrontal cortex. Hyperactivity and impaired memory function in offspring. Altered brain development.	Aldad, 2012
0.0009 W/Kg	Changes in brain glial cells with TDMA 836.55 MHz frequency	Stagg, 1997
0.0016 - 0.0044 W/Kg	Very low power 700 MHz CW affects excitability of hippocampus tissue, consistent with reported behavioral changes.	Tattersall, 2001
0.0021 W/Kg	Heat shock protein HSP 70 is activated by very low intensity microwave exposure in human epithelial amnion cells	Kwee, 2001
0.0024 - 0.024 W/Kg	Digital cell phone RFR at very low intensities causes DNA damage in human cells; both DNA damage and impairment of DNA is reported	Phillips, 1998
0.0027 W/Kg	Changes in active avoidance conditioned behavioral effect is seen after one-half hour of pulsed radiofrequency radiation	Navakatikian, 1994
0.0035 W/Kg	900 MHz cell phone signal induces DNA breaks and early activation of p53 gene; short exposure of 2-12 hours leads cells to acquire greater survival chance - linked to tumor aggressiveness.	Marinelli, 2004
0.0095 W/Kg	MW modulated at 7 Hz produces more errors in short-term memory function on complex tasks (can affect cognitive processes such as attention and memory)	Lass, 2002
0.001 W/Kg	750 MHz continuous wave (CW) RFR exposure caused increase in heat shock protein (stress proteins). Equivalent to what would be induced by 3 degree C. heating of tissue (but no heating occurred)	De Pomerai, 2000

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
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Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

SAR (Watts/Kilogram)	Reference
0.001 W/Kg	Statistically significant change in intracellular calcium concentration in heart muscle cells exposed to RFR (900 MHz/50 Hz modulation) Wolke, 1996
0.0021 W/Kg	A significant change in cell proliferation not attributable to thermal heating. RFR induces non-thermal stress proteins (960 MHz GSM) Velizarov, 1999
0.004 - 0.008 W/Kg	915 MHz cell phone RFR caused pathological leakage of blood-brain barrier. Worst at lower SAR levels and worse with CW compared to Frequency of pathological changes was 35% in rats exposed to pulsed radiation at 50% to continuous wave RFR. Effects observed at a specific absorption (SA) of > 1.5 joules/Kg in human tissues Persson, 1997
0.0059 W/Kg	Cell phone RFR induces glioma (brain cancer) cells to significantly increase thymidine uptake, which may be indication of more cell division Stagg, 1997
0.014 W/Kg	Sperm damage from oxidative stress and lowered melatonin levels resulted from 2-hr per day/45 days exposure to 10 GHz. Kumar, 2012
0.015 W/Kg	Immune system effects - elevation of PFC count (antibody-producing cells) Veyret, 1991
0.02 W/Kg	A single, 2-hr exposure to GSM cell phone radiation results in serious neuron damage (brain cell damage) and death in cortex, hippocampus, and basal ganglia of brain- even 50+ days later blood-brain barrier is still leaking albumin (P<.002) following only one cell phone exposure Salford, 2003
0.026 W/Kg	Activity of c-jun (oncogene or cancer gene) was altered in cells after 20 minutes exposure to cell phone digital TDMA signal Ivaschuk, 1997
0.0317 W/Kg	Decrease in eating and drinking behavior Ray, 1990
0.037 W/Kg	Hyperactivity caused by nitric oxide synthase inhibitor is countered by exposure to ultra-wide band pulses (600/sec) for 30 min Seaman, 1999
0.037 - 0.040 W/Kg	A 1-hr cell phone exposure causes chromatin condensation; impaired DNA repair mechanisms; last 3 days (longer than stress response) the effect reaches saturation in only one hour of exposure; electro- sensitive (ES) people have different response in formation of DNA repair foci, compared to healthy individuals; effects depend on carrier frequency (915 MHz = 0.037 W/Kg but 1947 MHz = 0.040 W/Kg) Belyaev, 2008

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
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Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

SAR (Watts/Kilogram)	Reference
0.05 W/Kg	Significant increase in firing rate of neurons (350%) with pulsed 900 MHz cell phone radiation exposure (but not with CW) in avian brain cells Beason, 2002
0.09 W/Kg	900 MHz study of mice for 7 days, 12-hr per day (whole-body) resulted in significant effect on mitochondria and genome stability Aitken, 2005
0.091 W/Kg	Wireless internet 2400 MHz, 24-hrs per day/20 weeks increased DNA damage and reduced DNA repair; levels below 802.11 g Authors say "findings raise questions about safety of radiofrequency exposure from Wi-Fi internet access devices for growing organisms of reproductive age, with a potential effect on fertility and integrity of germ cells" (male germ cells are the reproductive cells=sperm) Atasoy, 2012
0.11 W/Kg	Increased cell death (apoptosis) and DNA fragmentation at 2.45 GHz for 35 days exposure (chronic exposure study) Kesari, 2010
0.121 W/Kg	Cardiovascular system shows significant decrease in arterial blood pressure (hypotension) after exposure to ultra-wide band pulses Lu, 1999
0.13 - 1.4 W/Kg	Lymphoma cancer rate doubled with two 1/2-hr exposures per day of cell phone radiation for 18 months (pulsed 900 MHz cell signal) Repacholi, 1997
0.14 W/Kg	Elevation of immune response to RFR exposure Elekes, 1996
0.141 W/Kg	Structural changes in testes - smaller diameter of seminiferous Dasdag, 1999
0.15 - 0.4 W/Kg	Statistically significant increase in malignant tumors in rats chronically exposed to RFR Chou, 1992
0.26 W/Kg	Harmful effects to the eye/certain drugs sensitize the eye to RFR Kues, 1992
0.28 - 1.33 W/Kg	Significant increase in reported headaches with increasing use of hand-held cell phone use (maximum tested was 60 min per day) Chia, 2000
0.3 - 0.44 W/Kg	Cell phone use results in changes in cognitive thinking/mental tasks related to memory retrieval Krause, 2000
0.3 - 0.44 W/Kg	Attention function of brain and brain responses are speeded up Preece, 1999
0.3 - 0.46 W/Kg	Cell phone RFR doubles pathological leakage of blood-brain barrier permeability at two days (P=.002) and triples permeability at four days (P=.001) at 1800 MHz GSM cell phone radiation Schirmacher, 2000

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Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

SAR (Watts/Kilogram)	Reference
0.43 W/Kg	Significant decrease in sperm motility; drop in sperm concentration; and decrease in seminiferous tubules at 800 MHz, 8-hr/day, 12 weeks, with mobile phone radiation level on STANDBY ONLY (in rabbits) Salama, 2008
0.5 W/Kg	900 MHz pulsed RF affects firing rate of neurons (Lymnea stagnalis) but continuous wave had no effect Bolshakov, 1992
0.58 - 0.75 W/Kg	Decrease in brain tumors after chronic exposure to RFR at 836 MHz Adey, 1999
0.6 - 0.9 W/Kg	Mouse embryos develop fragile cranial bones from in utero 900 MHz The authors say "(O)ur results clearly show that even modest exposure (e.g., 6 min daily for 21 days)" is sufficient to interfere with the normal mouse developmental process" Fragopoulou, 2009
0.6 and 1.2 W/Kg	Increase in DNA single and double-strand DNA breaks in rat brain cells with exposure to 2450 MHz RFR Lai & Singh, 1996
0.795 W/Kg	GSM 900 MHz, 217 Hz significantly decreases ovarian development and size of ovaries, due to DNA damage and premature cell death of nurse cells and follicles in ovaries (that nourish egg cells) Panagopoulous, 2012
0.87 W/Kg	Altered human mental performance after exposure to GSM cell phone radiation (900 MHz TDMA digital cell phone signal) Hamblin, 2004
0.87 W/Kg	Change in human brainwaves; decrease in EEG potential and statistically significant change in alpha (8-13 Hz) and beta (13-22 Hz) brainwave activity in humans at 900 MHz; exposures 6/min per day for 21 days (chronic exposure) D'Costa, 2003
0.9 W/Kg	Decreased sperm count and more sperm cell death (apoptosis) after 35 days exposure, 2-hr per day Kesari, 2012
< 1.0 W/Kg	Rats exposed to mobile phone radiation on STANDBY ONLY for 11-hr 45-min plus 15-min TRANSMIT mode; 2 times per day for 21 days showed decreased number of ovarian follicles in pups born to these pregnant rats. The authors conclude "the decreased number of follicles in pups exposed to mobile phone microwaves suggest that intrauterine exposure has toxic effects on ovaries." Gul, 2009
0.4 - 1.0 W/Kg	One 6-hr exposure to 1800 MHz cell phone radiation in human sperm cells caused a significant dose response and reduced sperm motility and viability; reactive oxygen species levels were significantly increased after exposure to 1.0 W/Kg; study confirms detrimental effects of RF/MW to human sperm. The authors conclude "(T)hese findings have clear implications for the safety of extensive mobile phone use by males of reproductive age, potentially affecting both their fertility and the health and wellbeing of their offspring." De Iuliis, 2009

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

SAR (Watts/Kilogram)		Reference
1.0 W/Kg	Human semen degraded by exposure to cell phone frequency RF increased free-radical damage.	De Iuliis, 2009
1.0 W/Kg	Motility, sperm count, sperm morphology, and viability reduced in active cell phone users (human males) in dose-dependent manner.	Agarwal, 2008
1.0 W/Kg	GSM cell phone use modulates brain wave oscillations and sleep EEG	Huber, 2002
1.0 W/Kg	Cell phone RFR during waking hours affects brain wave activity. (EEG patterns) during subsequent sleep	Achermann, 2000
1.0 W/Kg	Cell phone use causes nitric oxide (NO) nasal vasodilation (swelling inside nasal passage) on side of head phone use	Paredi, 2001
1.0 W/Kg	Four-fold increase in eye cancer (uveal melanoma) in cell phone users	Stang, 2001
1.0 W/Kg	Increase in headache, fatigue and heating behind ear in cell phone users	Sandstrom, 2001
1.0 W/Kg	Significant increase in concentration difficulties using 1800 MHz cell phone compared to 900 MHz cell phone	Santini, 2001
1.0 W/Kg	Sleep patterns and brain wave activity are changed with 900 MHz cell phone radiation exposure during sleep	Borbely, 1999
1.4 W/Kg	GSM cell phone exposure induced heat shock protein HSP 70 by 360% (stress response) and phosphorylation of ELK-1 by 390%	Weisbrot, 2003
1.46 W/Kg	850 MHz cell phone radiation decreases sperm motility, viability is significantly decreased; increased oxidative damage (free-radicals) significantly decreased; increased oxidative damage (free-radicals)	Agarwal, 2009
1.48 W/Kg	A significant decrease in protein kinase C activity at 112 MHz with 2-hr per day for 35 days; hippocampus is site, consistent with reports that RFR negatively affects learning and memory functions	Paulraj, 2004
1.0 - 2.0 W/Kg	Significant elevation in micronuclei in peripheral blood cells at 2450 MHz (8 treatments of 2-hr each)	Trosic, 2002
1.5 W/Kg	GSM cell phone exposure affected gene expression levels in tumor suppressor p53-deficient embryonic stem cells; and significantly increased HSP 70 heat shock protein production	Czyz, 2004

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure
(Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

SAR (Watts/Kilogram)	Reference
1.8 W/Kg	Whole-body exposure to RF cell phone radiation of 900-1800 MHz 1 cm from head of rats caused high incidence of sperm cell death; deformation of sperm cells; prominent clumping together of sperm cells into "grass bundle shapes" that are unable to separate/swim. Sperm cells unable to swim and fertilize in normal manner. Yan, 2007
2.0 W/Kg	GSM cell phone exposure of 1-hr activated heat shock protein HSP 27 (stress response) and P38 MAPK (mutagen-activated protein kinase) that authors say facilitates brain cancer and increased blood-brain barrier permeability, allowing toxins to cross BBB into brain Leszczynski, 2002
2 W/Kg	900 MHz cell phone exposure caused brain cell oxidative damage by increasing levels of NO, MDA, XO and ADA in brain cells; caused statistically significant increase in 'dark neurons' or damaged brain cells in cortex, hippocampus and basal ganglia with a 1-hr exposure for 7 consecutive days Ilhan, 2004
2.6 W/Kg	900 MHz cell phone exposure for 1-hr significantly altered protein expression levels in 38 proteins following irradiation; activates P38 MAP kinase stress signalling pathway and leads to changes in cell size and shape (shrinking and rounding up) and to activation of HSP 27, a stress protein (heat shock protein) Leszczynski, 2004
2.0 - 3.0 W/Kg	RFR accelerated development of both skin and breast tumors Szmigielski, 1982
2 W/Kg	Pulse-modulated RFR and MF affect brain physiology (sleep study) Schmidt, 2012

STANDARDS	
0.08 W/Kg	IEEE Standard uncontrolled public environment (whole body) IEEE
0.4 W/Kg	IEEE Standard controlled occupational environment (whole body) IEEE
1.6 W/Kg	FCC (IEEE) SAR limit for 1 gram of tissue in a partial body exposure FCC, 1996
2 W/Kg	ICNIRP SAR limit for 10 grams of tissue ICNIRP, 1996

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

[REDACTED]

Exhibit 3

AFFIDAVIT OF DAVID O. CARPENTER, MD IN SUPPORT OF STANDING

Carpenter Exhibit 3

Excerpt from p. 1 and relevant citations, Bandara P, Carpenter DO. Planetary electromagnetic pollution: it is time to assess its impact. *The Lancet Planetary Health*. 2(12):Pe512-e514, December 01, 2018, [https://doi.org/10.1016/S2542-5196\(18\)30221-3](https://doi.org/10.1016/S2542-5196(18)30221-3), public version at [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(18\)30221-3/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30221-3/fulltext).

Due to the exponential increase in the use of wireless personal communication devices (eg, mobile or cordless phones and WiFi or Bluetooth-enabled devices) and the infrastructure facilitating them, levels of exposure to radiofrequency electromagnetic radiation around the 1 GHz frequency band, which is mostly used for modern wireless communications, have increased from extremely low natural levels by about 10^{18} times. Radiofrequency electromagnetic radiation is also used for radar, security scanners, smart meters, and medical equipment (MRI, diathermy, and radiofrequency ablation). It is plausibly the most rapidly increasing anthropogenic environmental exposure since the mid-20th century, and levels will surge considerably again, as technologies like the Internet of Things and 5G add millions more radiofrequency transmitters around us.

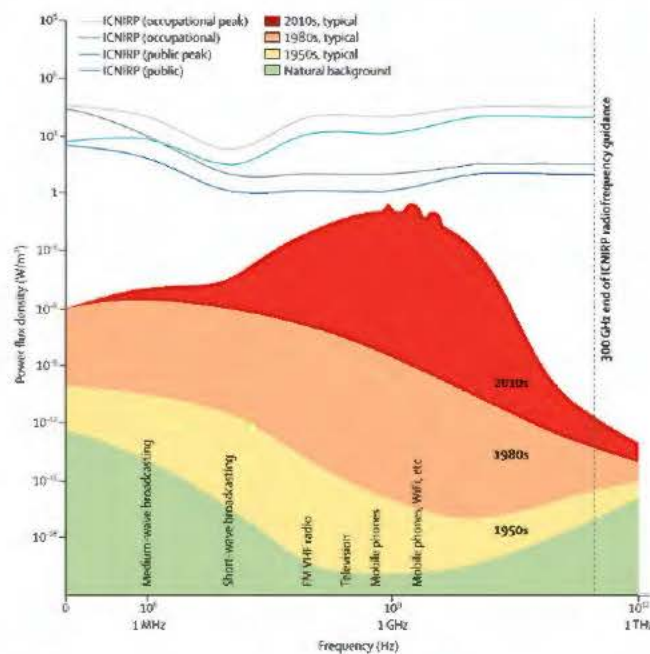


Figure: Typical maximum daily exposure to radiofrequency electromagnetic radiation from man-made and natural power flux densities in comparison with International Commission on Non-Ionizing Radiation Protection safety guidelines.¹

Anthropogenic radiofrequency electromagnetic radiation levels are illustrated for different periods in the evolution of wireless communication technologies. These exposure levels are frequently experienced daily by people using various wireless devices. The levels are instantaneous and not time-averaged over 6 minutes as specified by International Commission on Non-Ionizing Radiation Protection for thermal reasons. Figure modified from Philips and Lamburn¹² with permission. Natural levels of radiofrequency electromagnetic radiation were based on the NASA review report CR-166661.¹³

¹ International Commission on Non-Ionizing Radiation Protection. ICNIRP guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). *Health Phys* 1998; 74: 494–522.

¹² Philips A, Lamburn G. Natural and human-activity-generated electromagnetic fields on Earth. *Childhood Cancer* 2012; London; April 24–26, 2012.

¹³ Raines JK. NASA-CR-166661. Electromagnetic field interactions with the human body: observed effects and theories. NASA Technical Reports Server, 1981. <https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19810017132.pdf> (accessed Oct 10, 2018).

Declaration of Devra Lee Davis in Support of Standing

**IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

ENVIRONMENTAL HEALTH)	
TRUST, <i>et al.</i> ,)	
)	
Petitioners,)	
)	
v.)	Case No. 20-1025 (L)
)	
FEDERAL COMMUNICATIONS)	
COMMISSION, <i>et al.</i> ,)	
)	
Respondents.)	

DECLARATION OF DEVRA LEE DAVIS, PhD, MPH

1. I, Devra Lee Davis, hereby state, under penalty of perjury, that the following information is true to my knowledge, information, and belief:

2. The Environmental Health Trust (EHT) is a non-profit 501(c)(3) scientific and educational organization that I founded in 2007 to address environmental health issues relating to my past work in environmental epidemiology and toxicology. Appendix A to this Declaration provides additional information concerning my background and experience.

3. EHT provides a number of important services to the general public, the scientific community, medical and public health experts, and academia.

a. *First*, EHT initiates, conducts, oversees and aggregates peer-reviewed, science-based information to inform the public, as well as scientists,

health professionals, and educators, regarding controllable environmental health hazards and policies to reduce those hazards. Currently, our major priorities have shifted from broader environmental health risks to focus on assessing and educating the public and other constituencies regarding health, safety, and environmental risks from exposures to radiofrequency (RF) emissions from cellphones, computers, Wi-Fi environments, and cellphone towers and associated telecommunications equipment.

b. *Second*, numerous local, state and national organizations, as well as scientists, health professionals, and academic researchers, rely on EHT to provide independent reviews, evaluations, and critiques of relevant scientific information and studies regarding RF health and environmental impacts to inform their own work and research priorities. We are routinely contacted by scientists, researchers, and public health/medical professionals asking that EHT review third-party research and studies so that they have the benefit of EHT's opinions to support their own activities.

c. As one example of this type of service, EHT published in a peer-reviewed journal a vital critique of a widely-distributed paper by industry-sponsored researchers Kenneth Foster and C.K. Chou (2014), an evaluation that is used extensively by professionals who are researching RF health and safety risks. In that analysis, we documented numerous glaring internal inconsistencies and

systematic errors casting serious doubt on the paper's conclusion that children do not absorb higher peak doses of radiation from cellphones than adults.¹ As academics themselves, EHT's scientists publish this type of analysis and commentary on third-party research.

d. Yet another example involves EHT's efforts to organize seminars, lectures, and webinars attended by scientists, technology specialists, and medical/health experts that have been carried out from Melbourne University to Tel Aviv, Georgetown, and Istanbul, Turkey, in collaboration with the Pediatric Academic Societies and other health professional groups. The professional community relies on these events so they may benefit in their own work from EHT's analyses and research and use this information in developing recommendations to the public.²

e. *Third*, EHT provides advice on how to reduce RF exposures and use wireless technology more safely. We regularly receive inquiries from local, state and national governments, as well as individuals and others asking for

¹ See, e.g., *Children Absorb Higher Doses of Radio Frequency Electromagnetic Radiation From Mobile Phones Than Adults*, IEEE Access 3 (2015): 2379-2387, at <https://tinyurl.com/y69z5e7l>.

² See 2017 Expert Forum, Wireless Radiation and Health, at <https://tinyurl.com/yaddod7f>.

specific advice, such as reviewing an individual's particular exposure levels and circumstances to determine whether they may be at risk.

f. *Fourth*, EHT, in consultation with its expert advisors, initiates, funds and conducts research into key health-related and environmental issues. For instance, EHT has carried out modeling research on the degree to which RF penetrates the human body and what impacts such penetration might have on the developing testes and brain. Our group has also done similar research regarding the impacts of RF absorption in plants.

4. EHT's email contact list includes 22,818 individuals or organizations and more than 26,000 followers on Facebook. Media reach last year is estimated to have extended to 50 million globally. In addition to daily interactions with our followers on RF-related issues, EHT distributes information to these individuals and entities at least once per month, and published opinion pieces last year in the Chicago Tribune, International Business Times, Medium, The Hill, Oxford University Press, and several other online outlets.

5. I am filing this affidavit because the FCC's December 2019 Order terminated its 2013 Notice of Inquiry without giving any indication of having reviewed the thousands of pages of peer-reviewed evidence. In that terminating Order, the FCC concluded that, contrary to the advice of the American Academy of Pediatrics, the American Academy of Environmental Medicine, and other health

professional organizations, the FCC's 1996 RF exposure standards for cellphones, cellular antennas, and other infrastructure, as well as its testing procedures to approve cellphones for marketing and sale, do not need to be amended. This has short-circuited EHT's ability to fully perform many of the public services described above.

6. The FCC was derelict in its legal duty to adequately and fully assess all of the available science and research on RF-related issues when determining whether the agency's current RF exposure limits, as well as its cellphone testing protocols, protect consumers, citizens, and the environment. Thousands of public comments were submitted to the record, including multiple filings by EHT, its affiliated expert scientists, the American Academy of Pediatrics, representatives from the Israeli and Indian Academies of Pediatrics, the Deputy Director of the Indian National Medical Research Council of India and other expert authorities.

7. The administrative record contains numerous peer-reviewed studies and comments establishing that RF emissions at levels allowed by the FCC from cellphones, cellular towers, and other wireless equipment can result in serious short-term and long-term harm. These biological effects include permanent hearing loss through damage to the acoustic nerve, brain, thyroid and other cancers, neurological damage, and reproductive impacts. There is particular concern as to the adverse effects on children and other sensitive populations, like pregnant

women, as well as medically compromised people (like those with cancer or autoimmune disease). There are also comments in the record establishing that the FCC's cellphone testing protocols do not take into account these substantial health risks. And there are a number of studies and statements from expert scientists from the U.S. Department of Interior and the U.S. Department of the Navy finding damage from RF to birds, insects, and other flora and fauna.

8. The FCC was also under a legal obligation to fully detail and explain its analysis of these scientifically documented assessments and conclusions by taking a hard look at the accumulated record. Under the Telecommunications Act of 1996 (TCA), the Administrative Procedure Act (APA), and the National Environmental Policy Act (NEPA), the FCC had to satisfy its duty to set forth a systematic scientific and technical rationale supporting its conclusions regarding the validity and relevancy of the FCC's 1996 RF limits and testing procedures.

9. If the FCC had complied with these statutory obligations, its analysis would have examined in great detail whether the assumptions underlying a 20th century communications system could still be applied to 21st century technology, and would likely have represented the most exhaustive and far-reaching review of the relevant science to date.

10. But the record is clear that the FCC did not do any of this. There is no evidence in the Order indicating that the agency undertook a detailed analysis of

the public comments received since 2013 or previously, nor that it sought any systematic review from relevant expert sister health or environmental agencies. For instance, there is no discussion or even mention of the many studies and extensive comments submitted by EHT.

11. To the extent it did carry out any inquiry (which again, is not evident), the FCC completely failed to provide any detailed analysis to corroborate its decision, lacking in any sufficient explanation and discussion supporting its decisions not to update the RF exposure limits or testing protocols. Consistent with its failure to seek systematic review from relevant expert agencies, the FCC also did not share any methodology or analytic framework it applied during its purported review.

12. This left consumers, the public, and the scientific community without any guidance from the FCC. The scientists, public health experts, and academics who rely on EHT have been waiting for our experts to review and critique the FCC's work on the RF standards so they can gauge the Order's impact on their respective research and public health programs. Whatever the FCC's supporting rationale and conclusion, EHT's evaluation of that work would have played a role in identifying major data gaps and research priorities for future scientific study and public health services of other professionals.

13. But as the FCC did not set forth any discernible reasoning for its decision, EHT cannot readily advise those professionals and whether the FCC's decisions, in whole or in part, can be scientifically and technically justified. The record of agency decision-making is bare because there is no evidence whatsoever of any due deliberation regarding the substantial evidence submitted. As to the agency process of thinking, we are left to wonder. We have almost nothing to review or evaluate for our constituencies that would elucidate the underlying principles of the FCC's reaffirmation of these outdated standards.

14. Furthermore, EHT cannot fulfill its mission of informing the general public regarding the FCC's scientific basis and justification for the RF exposure limits, or provide specific advice to individuals looking for guidance from EHT when it comes to the RF standards.

15. EHT is constantly asked how the 20th century exposure limits set in 1996 could protect individuals and the environment when the types of cellphones and cellular services, like 4G and 5G, did not exist until the 21st century. People are understandably worried to learn that hundreds of thousands of new 5G antennas are going to be placed close together in communities, some at heights as low as 8 feet, others next to homes, schools, and public areas, which will significantly increase the amount of radiation that citizens are already exposed to through cellphones, Wi-fi, smart meters, and other cellular equipment. But EHT and the millions

concerned about this matter around the world have no answer as to why the FCC believes there is no health or environmental risk, especially when French, European Union, Indian, Israeli and more than a dozen other nations have taken steps to reduce these same exposures.

16. Likewise, when asked by state or local or other national authorities or by individuals whether specific RF levels they have measured and are exposed to daily are in fact safe, we have no valid scientific foundation offered by the FCC on which to draw to tell them why the agency claims without explanation that its limits serve as the appropriate measuring stick.

17. As the FCC did not comply with its legal obligations to undertake a hard look at the accumulated record of this docket, nor of previous submissions to earlier dockets, and has engaged in arbitrary and capricious behavior that is without foundation, EHT has to dedicate human and financial resources to providing answers to the questions that the agency failed to address.

18. Specifically, because the FCC decided not to revise its RF standards based on biological and environmental impacts, EHT now has to fill that vacuum. We are currently in the process of forming a partnership with other stakeholders that will take on the time-consuming and daunting task of developing health-based RF limits so that we can advise the general public, as well as scientists and

researchers, at what levels wireless technologies are safe. EHT has never pursued this type of project before.

19. Moreover, as the FCC refused to amend its cellphone testing procedures, and failed to explain why, EHT is working with former industry experts to devise improved systems for evaluating these risks from phones and other wireless technologies. EHT has never tested such devices in the past.

20. Before 2013, EHT dedicated only a portion of its resources to RF-related issues, including cellphone risks, and spent a considerable amount of time on other issues, such as asbestos, radon, lead, air pollution, and environmental causes of breast cancer. However, in recent years, EHT has devoted almost 90% of its expenditures to RF issues, with a specific focus on the FCC's review of the exposure limits and the need to account for health and environmental risks.

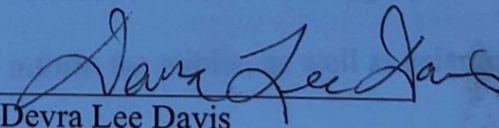
21. Had the FCC fairly considered all of the evidence regarding biological and environmental impacts of RF, it would have, as its French counterpart has done recently to great acclaim, amended its RF standards and testing protocols to take into account impacts on children, animals, and the environment, and lowered the exposure limits to safer levels. In that event, EHT could reduce the time and effort spent on RF-related issues, and instead dedicate its resources to non-RF initiatives such as expanding its work on air pollution, pesticides, hazardous wastes and public health in developing countries.

22. For example, EHT could devote attention to other environmental health hazards, as envisioned by our mission statement. For instance, we would like to build out our educational website to include updated scientific webpages with facts, science, and action steps related to lead, asbestos, and air pollution, especially as these impact impoverished communities and those of color. We have been asked to provide greater access to accumulated lectures and power-points on these and other critically important, avoidable environmental health hazards.

23. But none of this is possible, and we will not have the time and financial resources to dedicate to these other pressing environmental health issues, as long as the FCC fails to meet its RF-related obligations, and finally develop both safer limits for RF exposure to protect public health and the environment, as well as more realistic cellphone testing procedures. We are daily reminded of the profound changes in uses and users of the technology that are rapidly evolving during this time of pandemic when children of young ages are being required to spend hours a day relying on such technology. To provide these individuals and others with public services expected of EHT, we must fill the FCC's void.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 29th July, 2020


Devra Lee Davis

**IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

ENVIRONMENTAL HEALTH
TRUST, *et al.*,

Petitioners,

v.

FEDERAL COMMUNICATIONS
COMMISSION, *et al.*,

Respondents.

Case No. 20-1025 (L)

APPENDIX A

DEVRA LEE DAVIS, PhD, MPH

QUALIFICATIONS AND REPRESENTATIVE WORK

1. I am President and Founder of the Environmental Health Trust (EHT), Fellow of the American College of Epidemiology, author of more than 220 scientific publications, and editor of 13 scientific monographs or special journal issues. EHT is a non-profit 501(c)(3) scientific and educational organization that I founded in 2007 to address environmental health issues relating to my scientific publications in environmental epidemiology and toxicology, my National Book Award Finalist book, *When Smoke Ran Like Water*, Basic Books, 2002, and The *Secret History of the War on Cancer*, 2007.

2. I have served as Visiting Professor of Medicine at The Hebrew University of Jerusalem, Honorary Professor at the London School of Hygiene and Tropical Medicine, and Distinguished Visiting Professor at Yeshiva University.

3. I currently am Visiting Professor of Medicine at Ondokuz Mayis University in Samsun, Turkey, and Visiting Professor at Sichuan University in Chengdu, China, as well as a reviewing editor for peer-reviewed publications for *Environmental Research*, a professional scientific journal.

4. I was the founding Director of the Board on Environmental Studies and Toxicology of the U.S. National Academy of Sciences (NAS), and the Center for Environmental Oncology of the University of Pittsburgh Cancer Institute.

5. My scientific work has been published in the *Journal of the American Medical Association*, *The Lancet*, *Science*, and other highly-ranked publications.

6. I have served as an advisor to the U.S. Centers for Disease Control, the World Health Organization, the United Nations Development Program, and other comparable bodies, and from 1982 to 1985 was a member of the National Toxicology Program, Board of Scientific Counselors within the United States Department of Health and Human Services (HHS). The National Toxicology Program is an inter-agency program run by HHS to coordinate, evaluate, and report on toxicology within public agencies. The Board of Scientific Counselors is

a federally chartered external advisory committee whose members are appointed by the Secretary of Health and Human Services.

7. From 1998 to 2005, I was a member of the Intergovernmental Panel on Climate Change (IPCC) and the lead author of two chapters of the Report for the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC is an international treaty that evaluates the impacts of climate change on the environment and advises on adaptation and mitigation policies. In 2007, the IPCC and Vice-President Al Gore jointly received the Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change."

8. I have received several awards for my scientific papers and work, including a commendation from the Director of the National Cancer Institute, and designation of several papers as outstanding contributions to the field of environmental toxicology. I have also received grants for research from the National Institute of Environmental Health Sciences and a number of foundations.

9. I am a member of the Bioelectromagnetics Society and have been a Fellow of the American College of Toxicology and the American College of Epidemiology, as well as guest editor for several issues of scientific journals in public health.

10. As part of my work at the National Academy of Science, between 1983-1993, I served as Executive Director of several reports prepared for the Department of Defense, Committee on Toxicology, and the U.S. Environmental Protection Agency regarding the setting of standards for exposure to chemical and physical hazards in air and water and soil.

a. Since 2007, I have also dedicated a considerable amount of time to addressing the health, safety, and environmental risks of exposures to radiofrequencies (RF) from cellphones, cellular towers and facilities, and other wireless equipment.

11. Among related pursuits, I have on many occasions provided testimony and other briefings before Congressional members and other governmental bodies, including at the state and local levels, regarding RF-related issues, as well as presented research and studies to the FCC and other government decisionmakers. Much of this has involved the safety of cellphones and the significant inadequacies of the FCC's testing methods used to approve devices for marketing and sale.

12. Through EHT, I have also organized conferences and meetings involving experts from around the world, including governmental experts from their respective agencies dealing with radiation safety. As one example, we organized a 3-day meeting in Washington, D.C. in 2009 with governmental experts from the FCC, FDA, Switzerland, Israel, and Finland.

13. I have advised and worked with local governments around the world to develop and adopt cellphone right to know statutes. This was done to advance better protection and understanding of avoidable risk from cellphones and other devices.

14. In 2010, EHT led the production and preparation of a detailed report from assembled international expert scientists that recommended research priorities, data gaps and policy options, including ways to improve testing and regulation of cellphones to provide more realistic estimations of exposure and potential health and environmental risks. [View report here.](#)

15. In 2012, EHT scientists published peer-reviewed models for more effectively estimating exposures into the brains of children, with a call to FCC to change its testing protocol for cellphones.

16. EHT published a ten-year report in 2019 that promoted a better understanding of the nature of RF, with a particular focus on protecting and reducing exposure to pregnant women and children. [View report here.](#)

17. Under my direction, EHT also carried out major efforts at public education, working with media and other outlets to advise consumers on how to lower RF exposures (like children's brains and the abdomens of pregnant women). Our website contains extensive advice on minimizing exposures and using wireless technology safely. Our website can be found at www.ehtrust.org.

Declaration of Cynthia Franklin in Support of Standing

**IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

ENVIRONMENTAL HEALTH
TRUST, *et al.*,

Petitioners,

v.

FEDERAL COMMUNICATIONS
COMMISSION, *et al.*,

Respondents.

Case No. 20-1025 (L)

DECLARATION OF CYNTHIA FRANKLIN

1. I, Cynthia Franklin, hereby state, under penalty of perjury, that the following information is true to my knowledge, information, and belief:

2. I am the President of Consumers for Safe Cell Phones (“CSCP”), a 501(c)(3) non-profit organization. As the group’s name suggests, CSCP promotes the safe use of cellular technology and, as part of that effort, it must be able to adequately evaluate the health risks posed by exposures to radiofrequency radiation (“RFR”) emitted from cell phones, as well as exposures from associated wireless cellular infrastructure including cell towers, distributed small cells and building-mounted transmitters.

3. CSCP’s work centers on the fact that cell phones and associated

cellular infrastructure emit non-ionizing RFR that has been shown by thousands of peer-reviewed studies to pose biological risks, such as cancer, at or below the FCC's exposure limits.

4. One issue CSCP is focused on is the FCC's testing procedures for approving the marketing and sale of cell phones. Cell phone manufacturers are not required to test their products directly against the body even though consumers regularly keep their cell phones in pockets and bras. As a result, manufacturers are substantially underestimating actual RFR exposure levels when demonstrating compliance with the FCC's RFR exposure limits.

5. CSCP has approximately 5,400 social media followers who regularly receive vital information and advice from CSCP. The group also communicates with followers through emails and public speaking engagements.

6. CSCP provides updated information to its followers on, among other matters, the science and research being conducted on RFR and potential biological impacts. The group also provides specific advice to its followers on ways to reduce exposure to RFR emitted by cell phones and how to safely use devices. For example, advice is provided regarding safe distances to carry or use a cell phone or extra precautions to be taken for underaged or pregnant consumers. Our followers expect and demand that CSCP provides this guidance.

7. In offering these services, CSCP does not have the resources to

conduct its own scientific studies, but instead aggregates and reviews information from publicly available sources, including the FCC.

8. Since 2013, when the FCC announced that it would reassess whether its 1996 RFR exposure standards protect the public, groups like CSCP have anxiously awaited the results of that effort. We expected that the FCC would not only fairly evaluate the current research and studies on biological risks, but also adequately explain whether the 1996 standards guard against potentially harmful RFR emissions from cell phones and cellular infrastructure which, in turn, would also inform how manufacturers should test cell phones for compliance.

9. Instead, the FCC's final decision, which CSCP has challenged in this case, declined to amend the RFR standards or cell phone testing protocols to account for potential biological health risks and, more importantly, failed to explain in any detail why the FCC concluded that more stringent exposures limits are not needed. The FCC, which is the only agency charged under the Telecommunications Act of 1996 ("TCA") with making sure the public's health is protected from RFR emissions, has left all of us in the dark on how and why it decided that current research on biological risks does not warrant a change in the RFR standards or cellphone testing procedures.

10. We do not know why the FCC believes that the current RFR limits, which were adopted almost 25 years ago, still protect us even though patterns of

use and RFR exposures have changed significantly since 1996 (for example, users are more likely now to carry or use a cell phone in a pocket instead of a holster), with the number of users growing exponentially and the amount of radiation we are exposed to on a daily basis increasing substantially.

11. What would have been the result of a significant effort – where the FCC was legally required (under the TCA, the Administrative Procedure Act, and the National Environmental Policy Act) to assess the universe of scientific research since 1996, weigh all of the evidence, and then present its detailed analysis – was either not conducted at all or its underlying analysis has not been disclosed.

12. This means CSCP is not able to supplement the information that it provides to its followers with what should have been the most comprehensive assessment of RFR scientific research to date by the agency charged with protecting the public from RFR exposures. It also means that CSCP does not have the benefit of the FCC's work when giving advice on how to safely use cell phones. For instance, the FCC's updated analysis of the current RFR standards might have demonstrated that cell phones should be carried or used even farther from the body or with some type of shielding, or that time spent using them should be limited.

13. It also means that CSCP now has to expend time and money in the future to collect and assess disparate scientific research, an effort that would likely


not be necessary if the FCC had adequately considered studies submitted during the public comment period regarding biological impacts and fully explained their effect on establishing safer RFR exposure levels.

14. In the past several years, I have generally spent about 30 hours per week working on behalf of CSCP and value this work at \$100 per hour. I also estimate that about 40% of my time will be spent trying to obtain and analyze scientific research and studies in the absence of any FCC analysis.

15. The resources taking-up that 40% could have been used on other priorities of CSCP. For example, I had anticipated shifting that 40% to further researching the use of safer, wired alternatives (like fiber optics) to provide telecommunications services to low-income areas.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 29, 2020


Cynthia Franklin, President
Consumers for Safe Cell Phones

Declaration of Theodora Scarato in Support of Standing

**IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

ENVIRONMENTAL HEALTH)	
TRUST, <i>et al.</i> ,)	
)	
Petitioners,)	
)	
v.)	Case No. 20-1025 (L)
)	
FEDERAL COMMUNICATIONS)	
COMMISSION, <i>et al.</i> ,)	
)	
Respondents.)	
)	

DECLARATION OF THEODORA SCARATO

1. I, Theodora Scarato, hereby state, under penalty of perjury, that the following information is true to my knowledge, information, and belief:

2. I reside with my husband and two daughters in Montgomery County, MD, and have been married since 1996.

3. I received a bachelor's degree in 1994 and a master's degree in social work in 1998, both from the University of Maryland.

4. In the past, I practiced as a licensed social worker in various capacities since 1999, including working at a domestic violence shelter, directing an intensive therapy program in Montgomery County public schools, and working as a therapist at an ADHD clinic. I have since temporarily deactivated my social work clinical license as I am no longer maintaining a clinical practice and have

shifted my energy to focus on education and policy regarding the health impacts of electromagnetic fields.

5. I currently volunteer and work part-time for Environmental Health Trust (EHT) in the capacity of Executive Director. EHT is a non-profit scientific and educational organization that conducts research and outreach programs to provide various constituencies, including the scientific and academic communities, with information and analysis regarding the biological effects of radiofrequency (RF) radiation emitted by cell phones, wireless transmitters, and associated cellular infrastructure and equipment.

6. Outside of my duties for EHT, I spend approximately 20 or more additional hours per week voluntarily raising awareness and monitoring plans of the telecommunications industry for deploying advanced wireless transmitters and associated equipment in Maryland and nationwide.

7. In these volunteer activities, I work independently and also participate in several local citizens groups organized to prevent or at least slow the deployment of advanced wireless transmitters in Montgomery County, MD, where I currently live. These groups, like myself, are concerned that the regulations of the Federal Communications Commission (FCC) do not adequately protect the public and the environment from RF radiation.

8. I first became interested in the harmful impacts of RF radiation from telecommunications transmitters and wireless devices in 2012. This was the consequence of a conversation with a pediatrician combined with my own review of published scientific studies that had found an association between RF radiation and negative biological and health effects at levels below the maximum allowable RF limits in the FCC's regulations.

9. In November 2013, my family relocated from Montgomery County, MD to Prince George's County, MD. We moved because extra-low frequency electromagnetic field (ELF-EMF) radiation in my home from nearby power lines exceeded levels associated with cancer documented in published peer-reviewed research studies. My husband and I were concerned for our health, as well as the safety of our daughters.

10. Telecommunications transmitters and devices operate at a higher frequency than the non-ionizing ELF-EMF from power lines. However, the studies showing that cancer and other health effects associated with ELF-EMF heightened my interest in the effects of the higher frequency RF wireless radiation because both RF-EMF and ELF-EMF are non-ionizing radiation and thousands of studies have linked legally allowed exposures to adverse biological effects.

11. After considering my family's past use of cell phones, cordless phones and wireless devices, plus the rollout of "smart" utility meters in my neighborhood, I redoubled my research into the effects of RF radiation that year.

12. I learned in 2012 that the school my children were attending had installed a Wi-Fi network. From my research, I understood that, when powered on, Wi-Fi networks transmit continuous RF radiation. Students in my children's school would not be able to avoid these daily, continuous RF exposures. I also knew from my research that it had been shown that children are more vulnerable to the effects of this radiation compared to adults and that the radiation penetrated into their brains and bodies more intensely than into adults. Published studies of FCC-allowed levels of RF have found harmful effects in young, rapidly developing brains and because I was a social worker who worked with lead poisoned children I knew that such findings had grave implications and the issue required my immediate attention.

13. In response, from 2012 through 2014, I scheduled meetings with the administrators of my children's school to let them know of my concerns, and I provided the school administrators with copies of peer-reviewed, scientific research which had found harmful effects such as brain damage, increased cancer risk, impacts to memory, damage to reproductive organs, oxidative stress, and

more. I also shared letters from reputable scientists recommending Wi-Fi removal from schools.

14. Following these meetings, the school took RF measurements and concluded that the school's RF levels did not exceed the FCC's standards.

15. As a consequence of my efforts, the school removed Wi-Fi transmitters from the classrooms for young children through grade 3. However, the school retained Wi-Fi in other grades, including the grades in which my daughters were placed.

16. Out of concern for the health impacts of RF radiation on my children, I offered to raise money and help pay the cost of installing wired internet cables and connections throughout the school in order to replace the school's Wi-Fi network.

17. With the school's approval, in October 2013, I arranged to have an IT technician visit the school specifically in order to draft a plan for removing the Wi-Fi and replacing it with fully wired technology. Owing to the relatively small size of the school, the cost quoted to me was approximately \$3,000. However, when the IT technician came to the school that day, the staff said Wi-Fi would not be fully removed but, instead, some Wi-Fi access points would be moved from classrooms to hallways and more wired options would be installed.

18. I continued to advocate for the removal of Wi-Fi at my children's school and I provided information to the parents of students regarding the documented effects of RF radiation, but no further changes were made.

19. Given the fact that the school was unwilling to make additional changes that would reduce RF exposures to my children, I was compelled to home-school my children for the 2014-2015 academic year.

20. While home-schooling my children, I was not able to add more clients to my then growing social work practice as I had planned, thereby sacrificing substantial income-generating opportunities that I value at \$31,000 per annum as a conservative estimate.

21. In order to ease the negative economic impacts from home-schooling my children and to relieve the social and psychological impacts of the situation, I undertook a search to find a safe school that did not have Wi-Fi.

22. At different times throughout this period, I contacted and had in person meetings with, among others, administrative staff of Montgomery County (MD) Public Schools (MCPS) and Prince George's County (MD) Public School (PGCPS). All repeatedly refused to remove Wi-Fi from their schools despite my presentation of published research.

23. Significantly, MCPS and PGCPS both did RF measurements but found that levels were FCC compliant and, therefore, they concluded that they did

not need to replace Wi-Fi with safer networks. They referenced FCC limits and concluded that non-ionizing RF radiation would not harm their students because no US government agency had published a decision of such harm.

24. I explained to them that, in fact, there had not been any recent reviews of biological effects by any US health agency while there were ever mounting numbers of peer-reviewed scientific studies finding that non-ionizing RF radiation was associated with various biological effects. I responded to their conclusions that classrooms were “safe” with scientifically documented information showing Wi-Fi was associated with harmful effects and no federal agency had ever recently nor adequately researched the issue of safety.

25. Furthermore, then Governor O’Malley and the MD Department of Education directed me to the Maryland State Children’s Environmental Health and Protection Advisory Council (CEHPAC) where I raised my concerns again. It is notable that several years later, in 2017, CEHPAC released a report advising the MD Department of Education to recommend that local school districts reduce classroom wireless radiation exposures with recommendations that include providing wired rather than wireless internet connections.¹

26. After an exhaustive search at my own expense, I determined that the nearest school that did not have continuously transmitting Wi-Fi in its classrooms

¹ See <https://tinyurl.com/yd9nzh4n>.

was approximately 25 miles from our Prince George's County home, in nearby Montgomery County, MD.

27. At significant additional expense and inconvenience to the entire family, my husband and I enrolled our children in the Montgomery County school. For the next four school years (commencing with the 2015-2016 school year), our children commuted approximately 50 miles each day. The commute lasted an hour or more each way in rush hour traffic on Interstate Highway 495, a route that is heavily congested during weekday rush hours, five days a week, sometimes more (due to extracurricular activities or parent meetings at the school).

28. My husband and I tried during those four years to move closer to the school in order to reduce the expense and inconvenience of long commutes. However each time we identified an apartment or house in our price range, we found that the RF radiation measurements in the home were objectionable for not only my daughters but also my own health and that of my husband's, far higher than levels linked to harmful effects in research studies (even though they were compliant with the applicable FCC standards). We looked at over 60 homes in this time period, which involved an enormous amount of time and travel expense.

29. We specifically designed our search to find a residence that was not too close to an existing cellular tower and associated RF emissions.

30. We hired a professional technician to test the RF radiation of the homes in which we were most interested. This testing cost my husband and myself approximately \$1500.

31. Finally, in 2019, with substantial financial help from family, we relocated to a home in Montgomery County, MD, which did not have objectionable levels of RF radiation and was not too close to a cellular tower.

32. To this day, we continue to monitor outside RF levels to ensure that the health of our family is not put at an unnecessary risk.

33. I know that ambient RF exposure levels in the environment are going to significantly increase as local telecommunications carriers deploy new “5G ready” technology infrastructure. From my research, I know that the 5G plans of these telecommunications carriers involve the deployment of hundreds of thousands of additional wireless antennas (called “small cells”) to be mounted on structures including utility poles, street lights, and buildings across the nation. 4G is considered the “backbone” of 5G because once a structure has a wireless antenna, it is relatively easy to replace it with another type of antenna. First a 4G antenna goes up, then they add the 5G antenna later. 4G densification is part of the path to 5G.

34. Companies such as Verizon, T-Mobile, AT&T, and Sprint are some of the chief telecommunications service providers in Montgomery County, MD, and

are participating in these plans to densify wireless antennas in residential neighborhoods.

35. These 4G and 5G antenna facilities will be located throughout our neighborhoods and public spaces. They will be placed in rights-of-way, like our sidewalks, and along our streets, just outside our houses (including bedrooms), restaurants, stores, and offices.

36. In Montgomery County, where we currently live, companies such as Crown Castle have already installed small cell facilities. Crown Castle has additionally proposed to erect over a hundred new installations in Montgomery County, which Crown Castle will then rent out to Verizon, Sprint, T-Mobile, and other companies. Crown Castle hosts information on their plans for Montgomery County on their website² and Montgomery County also provides information on the current and proposed antenna installations on its website.³ The county information shows that over the last few years since the FCC 2013 Notice of Inquiry was issued, the numbers of installed and proposed installations has drastically increased.⁴

² See <https://tinyurl.com/y2hgk7vj>.

³ See <https://tinyurl.com/yxs8dsx3>.

⁴ See <https://tinyurl.com/y5op9ssp>.

37. At the federal level, the FCC is putting forward regulations and strategy to fast-track 5G.⁵ Companies state that 5G depends on densifying the poles and associated antennas close together (only hundreds of feet apart) in residential and commercial areas. Thus, because there are already proposals to put new antennas near my home, it is very likely that these facilities will be built near our current home and in our immediate neighborhood, significantly increasing the amount of radiation we are exposed to. I already have been involved in several local efforts to restrict new antennas added onto nearby large macro towers.

38. Because current RF levels permitted by the FCC pose serious health impacts, I have removed all wireless devices from my house and installed a wired only modem to connect our 5 computers to the internet without the use of Wi-Fi. I have replaced wireless thermostats with wired only models and ensured all appliances and security technology are free of wireless and Bluetooth. We use corded phones, not cordless phones or cell phones in our home.

39. I will also continue to incur costs related to RF-emitting electric utility meters. As already discussed, we have moved several times since I began my research on radiofrequency radiation, and each time we moved we have paid the energy company—PEPCO—an opt out fee so that our family would not be

⁵ See <https://tinyurl.com/yy68kcdt>.

exposed to RF emissions from the meter. Furthermore, now our water utility—WSSC—is proposing to make water meters “smart,” meaning wireless. It is WSSC’s position that the meters will not pose a health risk because they comply with FCC emission standards.⁶ Thus, it is likely that in the future I will now need to pay an “opt out” for my water meter as well.

40. However, I will not be able to control the increasing levels of RF that will permeate my house from outside RF sources such as cell antennas. I know I will incur additional costs as I continue my efforts to minimize the environmental levels of radiofrequency exposure outside of my home and my children’s school in the coming years. For example, I will need to measure the radiation regularly around my home and purchase new technical equipment which can measure 5G technology that often uses higher frequencies, such as millimeter waves.

41. I will also need to continue my efforts to protect my daughters in the school environment. There is now growing pressure to put Wi-Fi transmitters in my children’s school, and I spend considerable time trying to stop such actions and educate the school community. I paid money to hardwire a room in the school and am compelled this year to support new technology upgrades that are hardwired, not wireless because otherwise they will put in wireless technology. I am spending

⁶ See <https://tinyurl.com/y52pvpf9>.

considerable time monitoring the RF levels near the school because of new nearby cell installations and I follow permitting applications that would add more antennas to this site, as well as the larger antenna installation down the road.

42. If new 5G and 4G antennas are erected near our home, my children's school and in our neighborhood, my family will be subjected to even more daily RF emissions. And it is likely that we will spend even more time and money having to investigate relocating yet again to a safer area, if that will even be possible to find.

43. As demonstrated in my appeal, published research on the record clearly shows impacts to the brain and body at FCC-allowed RF levels, including cancer, memory damage, oxidative stress and other biological effects. If the FCC had adequately assessed documentation in the record, it would have decided that the current guidelines do not protect citizens, like myself and my family, and recommended that federal health and safety agencies develop proper safety limits based on current science to better ensure our health and safety, as well protecting the surrounding environment. The record also includes research showing that RF emissions from antennas can damage flora and fauna. Not only is it on the record that FCC limits were not even designed to protect birds, bees or trees , but more importantly, there is no health or environmental agency even considering the effects on wildlife.

44. Unfortunately, despite a legal obligation to conduct such an investigation under the Telecommunications Act of 1996, the Administrative Procedure Act ("TCA"), and the National Environmental Policy Act, the FCC instead issued a decision that has no explanation as to why the agency believes that current and future sources of RF exposure are sufficiently regulated under existing limits. The TCA specifically obligates the FCC to protect human health and the environment from excessive RF levels.

45. If the FCC issued lower RF exposure standards that account for biological impacts, my family, with me included, would not be involuntarily subjected to radiation levels that substantially jeopardize our health and well-being, and we would not be forced to continue incurring substantial costs (in the form of time, money, and emotional distress) to avoid harmful RF exposures.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 29, 2020


Theodora Scarato

Declaration of Liz Barris in Support of Standing

**IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

ENVIRONMENTAL HEALTH)

TRUST, *et al.*,)

Petitioners,)

v.)

Case No. 20-1025 (L)

FEDERAL COMMUNICATIONS)

COMMISSION, *et al.*,)

Respondents.)

DECLARATION OF ELIZABETH BARRIS

1. I, Elizabeth Barris, hereby state, under penalty of perjury, that the following information is true to my knowledge, information, and belief.

2. I am a resident of Topanga, California.



4. Until 2007, I was unaware that I suffered from any chronic or disabling medical conditions. I attended school as a child and young adult without any chronic health problems.

Health Problems 2007-Present

5. From approximately 2003 to 2017, I was gainfully employed and continued to enjoy good health overall until approximately 2007.

6. At that time, I began to suffer from a variety of unexplained chronic and disabling medical conditions, including ear ringing, migraine headaches, heart arrhythmia, loss of energy, dizziness, nausea, and vomiting. These conditions gradually came on over the span of several years after I moved to an apartment in Santa Monica in around 2005. Unbeknownst to me, there was a group of cell antennas on a rooftop, only a block-and-a-half from my apartment.

7. The intensity and frequency of these symptoms grew over time. I began to suspect that these conditions were due to various exposures of radiofrequency emissions and electromagnetic fields (“RFR-EMF”). I had a professional electromagnetic radiation specialist (Larry Gust, Director Bau Biology Institute) come out and measure the radiation in my apartment. He said it was “quite strong” and suggested shielding or moving. Because I loved my apartment and the area, I tried shielding and it did cut the radiation down, but found the frequencies were still getting in through the shielding and affecting me after a period of time. I also found it depressing to have to spend my entire day inside a small, dark, shielded area. So eventually, I had to move in order to stop being exposed to the RF.

8. It was around this time that I also had to stop going out in public, such as to coffee shops where I wrote on a daily basis, movie theaters, and restaurants, or engaging in anything that was near wireless infrastructure

and/or devices, like WIFI and smart phones. Basically, my entire way of life and all normalcy was leaving me. That was also extremely depressing for me.

9. I relocated my residence three times from 2012 to 2014 in an effort to get away from the wireless radiation emissions. However, moving afforded me no permanent relief as it became clear that the growing presence of RFR-EMF transmitters, smart phones, WIFI, and smart meters made it very difficult to escape exposure to the radiation.

10. Regarding my job, I eventually ended up working one day on, one day off, as I would get sick when I worked due to cell tower radiation exposure and needed a whole day to recuperate. But I needed the money so I continued this way, compromising my health in order to earn a living and earning basically half of what I normally would earn during a very busy season.

11. I ultimately ended up having to quit my job due to the constant RFR emissions I had to endure while on the job. My loss of income from 2017 to the present, as a direct result from my exposure to RFR-EMF and illness thereof, comes to approximately [REDACTED] last four years.

12. Because of the psychological stress and great depression of living with the symptoms of extra-sensitivity to RFR-EMF, including mental and emotionally debilitating isolation and loss of freedom of activity, I sought

the support of a psychologist. From approximately 2015 to 2018, I paid a total of [REDACTED] for visits to a psychologist to help me deal with the depression of the isolation and life changes that the RFR-EMF environment has had on my life. I would have gone more but it was very expensive [REDACTED] per hour, so I didn't.

On-Going Health Problems and Future Risks

13. To this day, I continue to suffer from excessive exposures to RFR-EMF that show no sign of abating and in fact has gotten much worse. I only experience some amount of relief when I am in areas where there are lower or almost no exposure levels. I also used to be able to mitigate or prevent exposures, but the newer frequencies, pulses, modulations and/or power densities have made that much more difficult.

14. One example of note involves living below my neighbors' WIFI, as well as pulsating RFR-EMF emissions from nearby utility smart meters, including a few that are within a few hundred feet from my apartment. The pulses from those smart meters were measured from inside my apartment by electromagnetic radiation specialist, William Holland, even though the meters are so far away. That is how powerful the pulses are and I believe this is why my radiation sickness has gotten so much worse over the years. Recently the upstairs neighbors had their WIFI "upgraded" which means their WIFI radiation is now also permeating inside my apartment despite the

shielding I had put up (it had previously been able to block their WIFI).

Even though this neighbor is above me, the WIFI radiation emissions are so powerful they are coming through my front door and windows, the only area of the apartment that I didn't block off with shielding so that I could receive natural light. I trained with Bau Biology Institute, passed all their courses in order to qualify as an electromagnetic radiation specialist and I used an RF meter to follow the emissions, so I know exactly where the radiation is coming from...it is my upstairs neighbors newly "upgraded" WIFI.

15. Based on prior testing performed by electromagnetic radiation specialist William Holland, which showed very low levels with the exception of intermittent smart meter pulses, the radiation in my apartment has increased substantially and it is difficult for me to occupy my own apartment due to this newly increased radiation from the neighbor. Even when shielded, it is still much more powerful than before. I hear the WIFI pulses on the meter I use for measuring RF, but I believe there may be new frequencies being used as the meter (an older one that is unable to measure the newer frequencies in use for 5G) is measuring very low power density, but the newer frequencies from the "upgraded" WIFI, the low power density, or the pulses and modulations, or all of it is making me very sick and I am NOT sick when I leave the apartment and go sleep in my car in the woods.

16. I now have shielding in front of the only windows that would otherwise allow natural light into my apartment and also in front of the door as the powerful WIFI radiation goes through everything. This shielding has cut the radiation down but it is still too high for me to live comfortably. It is also extremely depressing to have to live in my apartment during the day with the absence of any natural light at all.

17. Even when I go outside my apartment today, the WIFI and smart meter pulses permeate the common areas of the entire property and my front porch.

18. I have spent approximately \$31,000 over the years for the cost of meters to measure the radiation affecting me, shielding materials to try and block the radiation, and educational courses taken to try to understand it. This includes approximately \$8,000 for meters, approximately \$10,000 for education on microwaves and wireless radiation (and related fields), including classes on how to diagnose and mitigate these phenomena, and approximately \$15,000 for shielding. I have also been paying rent on an additional apartment with a metal roof deep in the woods but very far from my home (14 hours away) as I am afraid of the low orbit 5G WIFI satellites that promise to cover every square inch of earth. I rent this apartment as an emergency place I can go to get away from the radiation if I have to, if God forbid, the satellites or other infrastructure becomes too much to bear. It is

virtually cut off from society and my home is in LA, but I have this apartment in case things get really bad for me, which they currently are. I am currently staying in this apartment, unable to occupy my own home in LA due to the upgrade to the upstairs neighbors WIFI (who has refused by the way to go hard wired). Rental on this apartment is \$900 a month plus utilities and I have been paying it for the past year and a few months, spending extra money that I should not have to spend.

19. Additionally, spending any significant amount of time outside my home in LA and in public has become problematic as we are now, as a society, swimming in microwave radiation from cell antennas/towers, WIFI, smart meters, smart phones, cordless phones, smart printers, etc. Even taking my dog to the dog park is problematic due to strategically placed cell tower/antenna radiation and I wear shielding when I hike him in the mountains where I live in Topanga because on the mountain top is an array of cell tower equipment which I can feel and that gives me a headache from very far away.

20. Now when I do go out, I usually wear a metallic threaded shielding suit from head to toe that protects me from some (but not all) of the radiation. This brings in another problem, whereby I am ostracized and looked at strangely by people. This makes me uncomfortable and causes mental and emotional distress, so sometimes I have to choose between

suffering the pain from the mental and emotional distress from being ostracized, stared at and made fun of, or suffering the pain from the actual exposure.

21. I almost always drive wearing full body shielding due to the cell towers, but sometimes when driving on a freeway, if stuck in traffic, I can be stopped right in front of a super high-powered cell tower and, despite the shielding, I become sick from it because the radiation is so powerful it goes right through the shielding. I am generally sick for 1-2 days after an exposure like that, but when I was living in Santa Monica and did not yet know what was causing my illness, it sometimes lasted two whole weeks or more because I was still being exposed and not protecting myself.

22. I cannot work outside the home and can visit retail stores for only short periods of time because those spaces contain wireless devices (e.g., WIFI and wireless transmitters for cell reception, etc.), not to mention other nearby wireless infrastructure. Depending on the amount of radiation, I'm able to stay in retail stores for no more than a very short time, sometimes even less a few minutes before I risk a reaction. I have to completely avoid visiting restaurants, bars, coffee shops, and movie theaters, and cannot attend classes for furthering my education.

23. I also can no longer fly as the WIFI in the passenger cabin feels like a spike in my head and leaves me sick (vomiting and diarrhea) for a couple of days, even after a short, 2 hour flight.

24. My ongoing symptoms include heart arrhythmia, migraine headaches, dizziness, nausea, vomiting, diarrhea, extreme loss of energy, constant ringing in the ears, severe depression, and I am unable to drink coffee or alcohol anymore or eat fatty foods I believe due to organ problems from being exposed to microwaves.

25. I am also worried about the future as matters are only seem to be getting worse and at a rapid pace as more and more newer and higher frequencies are given carte blanche access to contaminate our air by the FCC. This would entail even more isolation, more sickness when exposed and more costs associated with my trying to live in a healthy and safe environment. First, the FCC is promoting the deployment by telecommunications carriers of hundreds of thousands of 5G wireless transmitting antennas and towers (a process known as “densification”) throughout neighborhoods and public spaces in this country, with each of these antennas/cell towers beaming non-stop RFR-EMF radiation at higher frequencies than previously transmitted. Second, some of these carriers plan to deliver 5G services using “millimeter waves,” a new and potentially more lethal form of RF radiation. Third, all indications are that society is only

going to increase the use of other devices and infrastructure to achieve the Internet of Things where electronic equipment is connected through RFR-EMF. Fourth, the FCC has just approved tens of thousands of “low orbit” 5G WIFI satellites to envelope the entire earth, for governmental/military and public use. There will quite literally be nowhere on earth to escape the pulses from the WIFI...or at least that’s the plan. Due to this astronomical amount of radiation exposure, I fear for my life. The FCC has the power to change this for me and so many others...I must also add that so many are now suffering but have no idea why they are getting sick, as they are being lied to about the safety of these non thermal, non-ionizing, radiation emitting devices and infrastructure by not only the FCC and the wireless industry, but also other governmental bodies like schools who routinely, on a daily basis, expose both children and teachers to ubiquitous WIFI in and out of the classroom and on school grounds.

26. I never consented to being subjected to RFR-EMF radiation. I have been involuntarily irradiated without my consent or knowledge. This radiation has made my life a living hell and has forced me at great personal cost, loss of wages, loss of social life, loss of freedom of movement in society and the pursuit of happiness, great physical and emotional pain, embarrassment and humiliation, and inconvenience to try to mitigate or avoid the radiation as best I can. This condition will quite possibly shorten

my life span, but in the meantime has resulted in horrific quality of life while I am still alive.

The FCC Must Adequately Re-Evaluate The RFR-EMF Standards

27. My symptoms appear at RFR-EMF levels that comply with FCC regulations, as the standards do not account for the radiation levels and other aspects of wireless technology that make me (and others like me) sick, such as pulse, modulation, frequency and low power density.

28. As set forth in my opening brief, RFR-EMF at current regulatory levels can lead to many adverse health impacts, including microwave sickness. The symptoms I suffer from are entirely consistent with numerous studies confirming that a certain percentage of our population is hyper-sensitive to RFR-EMF.

29. If the FCC had done an adequate review of the evidence that was submitted into the record for the 2013 Notice of Inquiry proceeding, it would have changed its current exposure limits to take these health risks into account. The FCC has a duty to do so and to protect human health and safety from RFR-EMF, under the Telecommunications Act of 1996, the Administrative Procedure Act, and the National Environmental Policy Act, among other legal requirements. Had the FCC done its job, it could have developed regulations that could eliminate my suffering and significantly improve my quality of life.

30. This failure of the FCC to reassess standards in light of these non-thermal effects continues to cause great suffering for me, severely limits my ability to function in society, hold a job, further my education, socialize, or participate in any of life's normal activities, including living comfortably in my own home. If these standards were appropriately revised by the FCC to deal with these current adverse, on-going and future effects, those efforts would provide relief from this constant suffering and my life (and many others) will have been substantially improved.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 7/29, 2020


Elizabeth Barris